Vol. 987 Number 1

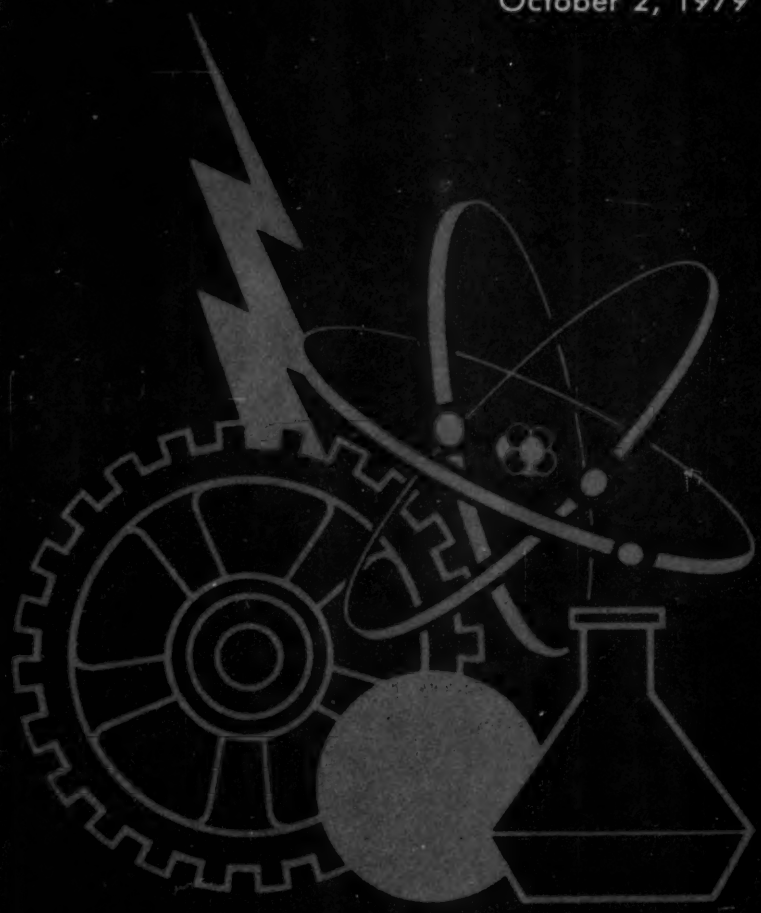
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

October 2, 1979



U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

October 2, 1979 Volume 987 Number 1

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $300.00 per annum for first-class mailing, also available as fourth-class mail at $200.00; foreign first-class mailing rates will be furnished upon request; single copies each, $4.00 domestic, $5.00 foreign.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

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Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT, including the amounts of the fees thereunder and the States that may be designated in international applications, consult the notice entitled "Update of information concerning the Patent Cooperation Treaty" appearing in the OFFICIAL GAZETTE of July 3, 1979.

Effective August 1, 1979 the international fees are increased to the following amounts:

Basic fee under PCT Rule 15.1(i) for an international application containing 30 sheets or less	$190.00
Supplemental fee to the Basic fee for each page of an international application in excess of 30 sheets	3.50
Designation fee under PCT Rule 15.1(ii)	45.00

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

July 3, 1979.

Board of Appeals Decisions Rendered in the Month of August 1979

Affirmed	246
Affirmed in Part	28
Reversed	98
Total	372

100th Anniversary of the Light Bulb

The Patent and Trademark Office along with the National Counsel of Patent Law Associations will co-sponsor a program to highlight the 100th anniversary of Edison's invention of the light bulb in the Public Search Room on Saturday, October 20 from 3:00 p.m. to 8:00 p.m. and Sunday, October 21 from 9:00 a.m. to 1:00 p.m. The public is invited to view this exhibit on October 20 and 21 and to attend the program to be held in conjunction with this exhibit at 4:30 p.m. on Saturday, October 20.

In order to accommodate this exhibit highlighting the 100th anniversary of Edison's incandescent lamp, it is necessary to close the Public Search Room at 5:00 p.m. on Friday, October 19, 1979.

We would appreciate the cooperation of all users of the Public Search Room by removing all personal belongings and items for the early closing on Friday, October 19.

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks.

September 10, 1979.

DEPARTMENT OF COMMERCE

[3510-16-M]

Patent and Trademark Office

[37 CFR Part 1]

ADVISORY OPINIONS ON VALIDITY OF PATENTS

Deferral of Rulemaking Proposal

AGENCY: Patent and Trademark Office, Commerce.

ACTION: Deferral of rulemaking proposal.

SUMMARY: Patent and Trademark Office is deferring its rulemaking proposal concerning advisory opinions on patent validity. The public hearing is postponed until further notice.

DATES: Hearing scheduled for April 11, 1979 is postponed.

ADDRESS: Commissioner of Patents and Trademarks, Building 3, Room 11E10, Washington, D.C. 20231.

FOR FURTHER INFORMATION CONTACT:

Mr. Herbert C. Wamsley by telephone at (703) 557-3071, or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

SUPPLEMENTARY INFORMATION: A notice of proposed rulemaking on advisory opinions on validity of patents was announced in the December 20, 1978 edition of the FEDERAL REGISTER (43 FR 59401). It also appeared in the January 4, 1979 issue of BNA's *Patent, Trademark and Copyright Journal* (410 PTCJ D-1), and in the January 16, 1979 edition of the Patent and Trademark Office's *Official Gazette* (978 O.G. 152). The date for the public hearing and the deadline for written comments were announced as April 11, 1979.

The Patent and Trademark Office has decided to delay consideration of this proposal. It would appear as though legislation may be introduced in the 96th Congress to establish a statutory procedure for reexamination of issued patents, perhaps including authority for the Office to use fees collected from the public to support the cost of reexamination. Accordingly, the present proposal may be unnecessary and therefore the public hearing is postponed until further notice. While members of the public are free to continue to submit written comments on the proposal, a further specific period for written comments will be set if the public hearing is rescheduled at a later date.

Dated: February 12, 1979.

DONALD W. BANNER,
Commissioner of Patents and Trademarks.

Approved:

Dated: February 16, 1979.

JORDAN J. BARUCH.
Assistant Secretary for Science and Technology.

[FR Doc. 79-5919 Filed 2-27-79; 8:45 am]

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

4,014,359, Re. S.N. 024,685, Filed Mar. 28, 1979, Cl. 137/078, SPRINKLER FLOW CONTROL SYSTEMS, George E. Sanner, Owner of Record: *Inventor,* Attorney or Agent: Richard D. Multer, et al., Ex. Gp.: 341

PATENT NOTICES

Certificates of Corrections for the Week of Oct. 2, 1979

D. 250,109	4,130,694	4,146,402	4,155,138
D. 250,142	4,130,827	4,146,488	4,155,161
D. 252,125	4,130,899	4,146,497	4,155,327
3,825,629	4,130,988	4,147,298	4,155,824
3,956,035	4,131,742	4,147,723	4,155,888
3,975,554	4,132,806	4,148,137	4,155,900
3,993,880	4,133,992	4,148,203	4,159,911
4,018,711	4,133,999	4,148,346	4,155,934
4,054,102	4,134,020	4,148,404	4,156,283
4,064,334	4,134,569	4,148,529	4,156,293
4,064,351	4,135,807	4,149,605	4,156,607
4,071,419	4,137,157	4,149,668	4,156,698
4,072,715	4,137,830	4,149,779	4,156,713
4,080,349	4,138,382	4,149,948	4,156,717
4,083,180	4,139,099	4,149,993	4,157,003
4,086,941	4,139,437	4,150,790	4,157,45/
4,089,263	4,139,784	4,150,987	4,157,614
4,091,965	4,140,817	4,151,102	4,157,913
4,092,255	4,140,907	4,151,140	4,157,956
4,096,129	4,141,529	4,151,602	4,158,069
4,097,558	4,141,662	4,152,141	4,158,114
4,097,919	4,142,139	4,152,891	4,158,393
4,099,139	4,142,447	4,152,932	4,158,416
4,100,110	4,142,986	4,153,277	4,158,563
4,102,711	4,143,387	4,153,729	4,158,577
4,102,849	4,143,546	4,154,115	4,158,595
4,102,959	4,143,679	4,154,467	4,158,657
4,106,052	4,143,698	4,154,630	4,158,702
4,106,065	4,143,735	4,154,728	4,158,763
4,108,318	4,143,891	4,154,767	4,158,822
4,114,750	4,144,101	4,154,801	4,158,842
4,116,203	4,144,117	4,154,834	4,158,855
4,116,770	4,144,189	4,154,843	4,159,711
4,120,838	4,144,302	4,154,846	4,160,076
4,122,238	4,144,457	4,154,932	4,160,090
4,123,458	4,144,723	4,154,938	4,160,097
4,123,704	4,145,013	4,154,956	4,160,276
4,124,543	4,145,210	4,155,060	4,160,609
4,125,722	4,145,740	4,155,119	4,160,620
4,129,444	4,146,218	4,155,130	

Disclaimers

3,991,572.—*Richard G. Huebscher,* Cleveland; *Ronald S. Sobecks,* Seven Hills; and *Joseph A. Birli,* Richmond Heights, Ohio. ELECTRO-THERMAL LINEAR ACTUATOR WITH INTERNAL RESERVOIR. Patent dated Nov. 16, 1976. Disclaimer filed July 25, 1979, by the assignee, *Design & Manufacturing Corporation.*

Hereby enters this disclaimer to claims 1, 5, 6 and 9 of said patent.

4,035,049.—*William H. McKee,* West Covina, Calif. UNIVERSAL SOLDERLESS TERMINATION SYSTEM. Patent dated July 12, 1977. Disclaimer filed July 13, 1979, by the inventor.

Hereby enters this disclaimer to claim 22 of said patent.

4,075,418.—*Mitsuo Nemoto,* Machida and *Kimiyasu Honma,* Kokubunji, Japan. STEREOPHONIC PICKUP CARTRIDGE. Patent dated Feb. 21, 1978. Disclaimer filed Oct. 16, 1978, by the assignee, *Kabushiki Kaisha Audio-Technica.*

Hereby enters this disclaimer to all that portion of the term of said patent subsequent to Sept. 25, 1990.

4,075,418. *Mitsuo Nemoto,* Machida and *Kimiyasu Honma,* Kokubunji, Japan. STEREOPHONIC PICKUP CARTRIDGE. Patent dated Feb. 21, 1978. Disclaimer filed Aug. 14, 1979, by the assignee, *Kabushiki Kaisha Audio-Technica.*

Hereby enters this disclaimer to claims 6, 7, 8, 9, 10, 11, 12 and 13 of said patent.

4,111,648.—*Bobby L. McConnell,* Greensboro, N.C.; *Raymond Thornton,* Lake Placid, N.Y., and *Louis A. Graham,* Greensboro, N.C. REACTIVE DYEING SYSTEMS USING DYES WITH CARBOXYLIC ACID GROUPS. Patent dated Sept. 5, 1978. Disclaimer filed Aug. 3, 1979, by the assignee, *Burlington Industries, Inc.*

Hereby enters their disclaimer to claims 13 and 14 of said patent.

4,153,305.—*Leroy P. Kennedy,* Mahwah, N.J., and *James L. Kalkstein,* Monsey, N.Y. RAILROAD AIR BRAKE SYSTEMS. Patent dated May 8, 1979. Disclaimer filed Aug. 3, 1979, by the assignee, *Abex Corporation.*

Hereby enters this disclaimer to claim 1 of said patent.

Dedication

4,153,523.—*Donald E. Koontz,* Summit, *Dennis R. Turner,* Chatham Township, Morris County, N.J. CONTINUOUS ELECTROCHEMICAL PROCESSING APPARATUS. Patent dated May 8, 1979. Dedication filed Aug. 5, 1979 by the assignee, *Bell Telephone Laboratories, Incorporated.*

Hereby dedicates to the Public the entire term of said patent.

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The libraries listed herein, designated as patent depository libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent months or years in some libraries to all or most of the patents issued since 1870, or earlier, in other libraries.

These patent collections are open to public use and each of the patent depository libraries, in addition, offers the publications of the patent classification system (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Depending upon the library, the patents may be available in microfilm, in bound volumes of paper copies, or in some combination of both. Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the patent depository libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Birmingham Public Library	(205) 254-2555
California	Los Angeles Public Library	(213) 626–7555 Ext. 274
	Sacramento: California State Library	(916) 322–4572
	Sunnyvale Patent Library*	(408) 736-0795
Colorado	Denver Public Library	(303) 573-5152 Ext. 223
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4519
Illinois	Chicago Public Library	(312) 269-2814
Massachusetts	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Detroit Public Library	(313) 833-1458
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 214
Nebraska	Lincoln: University of Nebraska-Lincoln, Love Library	(404) 472-3411
New Jersey	Newark Public Library	(201) 733-7740
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 790-6291
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County Public Library	(513) 369-6969
	Cleveland Public Library	(216) 623-2932
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 242–7361 Ext. 258
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Pennsylvania	Philadelphia: Franklin Institute Library	(215) 448-1226
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3128
	University Park: The Pennsylvania State Libraries	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-7722 Ext. 224
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 528-2957
Texas	Dallas Public Library	(214) 748-9071
	Houston: The Fondren Library. Rice University	(713) 527-8101 Ext. 2587
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3043

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JULY 28, 1979

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-8-79
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines: Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	8-18-78
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, Treating Processes, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions.	10-13-78
COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography.	6-21-78
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	3-6-78
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales.	12-19-77
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear and Reactors; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptograph; Laser Devices; Radioactive Materials; Power Metallurgy, Rocket Fuels.	4-10-78
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—N. ANSHER, Director. Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	7-12-78
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—A. L. SMITH, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	6-7-78
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-31-78
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-21-77
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—M. M. NEWMAN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-1-78
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter.	9-25-78
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—B. R. GRAY, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Information Dissemination.	7-21-78
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	6-9-78
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—G. M. FORLENZA, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Textiles; Apparel and Shoes; Sewing Machines; Machine Elements; Clutches.	2-16-78

Expiration of patents: The patents within the range of numbers indicated below expire during July 1979, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 3,041,614 to 3,047,872, inclusive
Plant Patents..... Numbers 2,155 to 2,159, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED OCTOBER 2, 1979

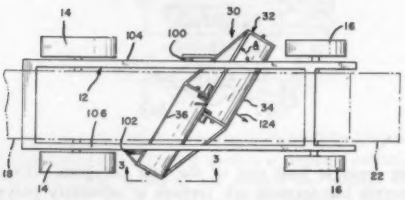
Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T987,001
BELT LOADER HAVING SWEEPING ASSEMBLY

Louis G. O'Brien, Camp Hill, Pa., assignor to The Pennsylvania Department of Transportation, Harrisburg, Pa.

Filed Apr. 9, 1979, Ser. No. 28,529
Int. Cl.[2] E01H *1/05*
U.S. Cl. 15—82
2 Sheets Drawing. 8 Pages Specification

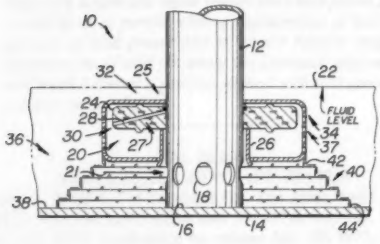


An improved belt loader of the type used to remove debris from a roadway includes an angled sweeping assembly comprising a pair of overlapping power driven rotary brushes with the downstream end of the lead brush overlapping the upstream end of the trailing brush so that the debris swept by both brushes is moved across the assembly and deposited by the side of the roadway.

T987,002
RESERVOIR WITH CONTROLLED PATHWAY TO A PUMP SUCTION LINE

Robert C. Hansen, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 12, 1978, Ser. No. 950,878
Int. Cl.[2] B01D *29/20, 35/02, 35/14*
U.S. Cl. 210—121
1 Sheets Drawing. 8 Pages Specification

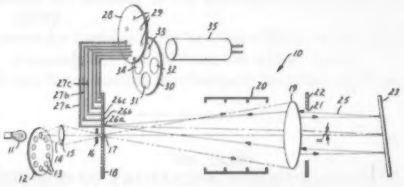


A reservoir (**10**) for a scavenging system has a suction line (**12**) of a pump disposed within the reservoir and a float mechanism (**24**) that controls the fluid pathway (**21**) from the reservoir into the suction line (**12**) in response to the height (**22**) of the fluid within the reservoir. This system restricts large volume of air from being drawn into the suction line as the fluid level in the reservoir is lowered. The float mechanism includes a sealing arrangement (**25**) to restrict air from being introduced into the openings from around the float mechanism (**24**) during operation of the system. An apparatus (**26**) is also associated with the float mechanism (**24**) to cause the pathway (**21**) to be significantly lowered relative to the level (**22**) of the fluid and the openings (**18**) in the suction line (**12**). This system allows the fluid level (**22**) in the reservoir (**10**) to be at a very low level without drawing any appreciable amount of air into the suction line (**12**), while providing very low restriction to the flow of the fluid into the suction line (**12**) at high levels (**22**) of the fluid.

T987,003
RETROLUMINOMETER

Norbert L. Johnson, Oakdale, and Michael J. Knowd, New Brighton, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 31, 1978, Ser. No. 929,299
Int. Cl.[2] G01N *21/48*
U.S. Cl. 356—445
2 Sheets Drawing. 8 Pages Specification



A retroluminometer for measuring retroreflectivity of signs or markings at their actual point of use comprises (1) a source of alternating light; (2) optical means for both directing the alternating light onto a sign or marking that is to be tested and for transmitting light retroreflected by the sign or marking onto a panel within the retroluminometer; (3) a matrix of light-transmitting means arranged on the face of the panel; (4) photosensing means optically connected to the light-transmitting means and adjustable to sense and measure the light from different ones of the light-transmitting means, thereby measuring retroreflection at different angles of deviation from the axis of the light beam incident on the sign or marking; and (5) electric circuitry for presenting the photosensed light as a visually-readable measurement. The electric circuitry includes filtering circuitry for filtering out signals having a frequency different from that of the alternating source so as to eliminate the effect of ambient or extraneous light.

T987,004

SYSTEM FOR DETERMINING THE EXTENT OF OVERLAP BETWEEN TWO POLYGONS

Michael Feuer, and Ning Nan, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

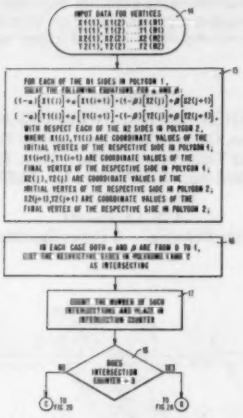
Continuation of Ser. No. 434,306, Jan. 17, 1974, abandoned, which is a continuation of Ser. No. 266,187, Jun. 26, 1972, abandoned. This application Jan. 17, 1979, Ser. No. 4,121

Int. Cl.[2] G06F *15/46*

U.S. Cl. 364—300

11 Sheets Drawing. 84 Pages Specification

A system for determining the extent of overlap between two primary polygons which are simply connected and have vertices of known coordinate values. Each of the sides in each polygon is first defined in terms of parameters which have limits of constant values as shown by block **14** in FIG. **2.** Then, as set forth in block **15** in FIG. **2,** a determination is made as to whether each of the sides in one of the polygons intersects any side in the other polygon by respectively equating the parametric definitions of each of the sides in the first polygon with the parametric definitions of each of the sides in the second polygon. A pair of sides so equated will intersect if each side has a resultant parameter within said limits. Routines are provided for determining when intersections will be non-degenerate, and when they will be degenerate, and when there will be no intersections thus indicating that the polygons either completely overlap or have no overlap at all. Intersections will be non-degenerate if the resultant parameters for each of the sides is somewhere between said limits. Intersections will be degenerate if the resultant parameter for either side is at one of its limits. A non-degenerate intersection is defined as one involving only one side from each of the two polygons while a degenerate intersection involves an additional side from at least one of the two polygons. The non-degenerate intersections are vertices in subsidiary polygons formed by the overlap of the two primary polygons.


INPUT DATA FOR VERTICES
FOR EACH OF THE N1 SIDES IN POLYGON 1,
SOLVE THE FOLLOWING EQUATIONS FOR α AND β
WITH RESPECT EACH OF THE N2 SIDES IN POLYGON 2,
IN EACH CASE BOTH α AND β ARE FROM 0 TO 1,
LIST THE RESPECTIVE SIDES IN POLYGONS 1 AND 2
AS INTERSECTING
COUNT THE NUMBER OF SUCH
INTERSECTIONS AND PLACE IN
INTERSECTION COUNTER
DOES
INTERSECTION
COUNTER = 0
NO
YES
TO
FIG 2B
TO
FIG 2A

REISSUES

OCTOBER 2, 1979

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

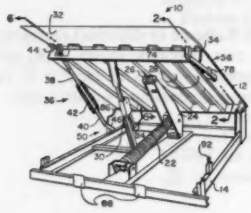
Re. 30,104
DOCK LEVELING APPARATUS

Peter B. Burnham, Upper Arlington, Ohio, assignor to Harsco Corporation, Camp Hill, Pa.

Original No. 3,982,295, dated Sep. 28, 1976, Ser. No. 579,686, May 21, 1975. Application for reissue Mar. 11, 1977, Ser. No. 776,514

Int. Cl.[2] **E01D** *1/00*

U.S. Cl. 14—71.3 **22 Claims**



16. Lip lock means for maintaining a pivotable lip of a pivotable ramp associated with a loading dock in a projected position until released by (1) pivoting the lip to a position near parallel with the ramp or by (2) pivoting the lip end of the ramp to a downwardly inclined position to engage lip lock release means,

comprising in mechanically coupled relationship between the pivotable lip and ramp

support means carrying an elongated pin in underlying relationship to the ramp and lip,

an elongated plate having one end thereof pivotally supported to permit swinging movement thereof in a plane transverse to the axis of said pin disposed beneath the ramp and lip in longitudinally extending relationship thereto, said plate having formed therein a notch with an axis parallel to said pin

and opening at a longitudinal edge of the plate for receiving said pin when the lip is pivoted to the projected position, said notch having surface means shaped to prevent the pin from being relatively cammed from the notch as a result of force exerted by the weight of the lip,

a block disposed adjacent said plate in longitudinally slideable relationship thereto and having formed therein a groove with an axis parallel to said pin and opening at an edge surface to receive said pin when aligned with the notch in said plate,

means securing said block in association with said plate to permit relative longitudinal displacement between said plate and block, said means including the U-shaped bracket secured to said block with the open end of said bracket facing toward the edge of said block at which the groove opens for retaining the pin in association with said block, said bracket being of a length and depth greater than said pin and secured to said block to permit relative displacement of said pin into and out of said groove and to permit relative longitudinal displacement of said pin along the aforesaid edge surface of said block between a position aligned with said groove and a position not so aligned.

Re. 30,105
FLUID MEASURING APPARATUS

Jerome A. Rodder, 775 Sunshine Dr., Los Altos, Calif. 94022

Original No. 3,971,247, dated Jul. 27, 1976, Ser. No. 523,995, Nov. 15, 1974. Application for reissue Apr. 29, 1977, Ser. No. 792,478

Int. Cl.[2] **G01F** *1/68;* **G01N** *31/00*

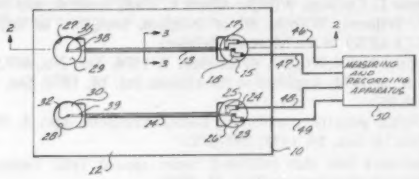
U.S. Cl. 73—27 R **28 Claims**

1. Fluid measuring apparatus comprising:

a housing having an elongated cavity enclosed on its sides and open at its ends;

a thin elongated, i.e., uncoiled, hot wire bent in half to extend along the length of the cavity;

first means at one end of the cavity for supporting the ends of the wire in fixed relationship longitudinally and laterally with respect to each other and electrically isolated from each other, *the first wire supporting means comprising a printed circuit board, first and second mutually isolated conductive pads lying entirely on the circuit board, solder connections between the ends of the hot wire and the first and second pads, respectively, and a pair of electrical leads interconnected between the pads, respectively, and the measuring means;*



second means at the other end of the cavity for supporting the middle of the wire, the second wire supporting means comprising a deformed spring that exerts tension on the middle of the hot wire to keep the hot wire taut as its length changes, permits longitudinal movement of the middle of the wire, and prevents lateral movement of the middle of the wire, the first and second supporting means cooperating to maintain the halves of the wire in spaced approximately parallel relationship from each other and in spaced relationship from the sides of the cavity;

means for forming in the housing a fluid entrance to the cavity;

means for forming in the housing a fluid exit from the cavity longitudinally spaced from the entrance; and

means for measuring the change in resistance of the hot wire.

Re. 30,106
METHOD OF PRODUCING AMORPHOUS CUTTING BLADES

Donald E. Polk, Boston, Mass., and Robert C. Morris, Ledgewood, N.J., assignors to Allied Chemical Corporation, Morris Township, Morris County, N.J.

Original No. 3,940,293, dated Feb. 24, 1976, Ser. No. 544,164, Jan. 27, 1975. Division of Ser. No. 317,039, Dec. 20, 1972, Pat. No. 3,871,836. Application for reissue Feb. 21, 1978, Ser. No. 879,314

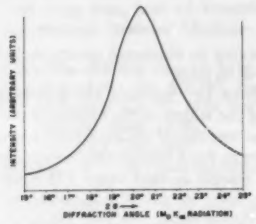
The portion of the term of this patent subsequent to Mar. 18, 1992, has been disclaimed.

Int. Cl.[2] **C21D** *1/00;* **B26B** *21/54;* **B32B** *15/00*

U.S. Cl. 204—23 **12 Claims**

1. In a process of preparing a [metal] cutting implement [by shaping a metal strip into the desired implement form and sharpening a cutting edge on said implement], the improvement which comprises quenching a molten metal alloy under conditions producing [the] *a* metal strip in at least 50 percent amorphous state, said metal alloy having the composition represented by M_aX_b, where M is at least one element selected from the group consisting of Ni, Fe, Co, Cr and V, X is at least

one element selected from the group consisting of P, B, C, Si, Al, Sb, Sn, In, Ge and Be, a ranges from 65 atomic percent to



90 atomic percent and b ranges from 10 atomic percent to 35 atomic percent.

Re. 30,107

THERMOGRAPHIC RECORDING PROCESS

Urbain L. Laridon, Wilrijk; Albert L. Poot, Kontich, and Jozef F. Willems, Wilrijk, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Original No. 3,996,397, dated Dec. 7, 1976, Ser. No. 457,547, Apr. 3, 1974. Application for reissue Jul. 18, 1978, Ser. No. 925,962

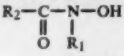
Claims priority, application United Kingdom, Apr. 4, 1973, 16166/73; Jun. 19, 1973, 29073/73

Disclosure was also published under second Trial Voluntary Protest Programs on Feb. 17, 1976

Int. Cl.[2] B41M *5/12, 5/18*

U.S. Cl. 427—145 **11 Claims**

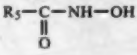
1. A recording process, which comprises exposing to a heat pattern a support carrying an organic reducing compound corresponding to one of the following general formulae:


(I)

wherein:

R_1 represents hydrogen, an aliphatic group containing up to about four carbon atoms; and R_2 represents an alkoxy group containing up to 18 carbon atoms, an aryloxy group, an amino group of the formula

in which R_3 and R_4 (same or different) represent hydrogen, an aliphatic group or an aromatic group, or R_3 and R_4 represent together the necessary atoms to close a 5- or 6-membered heterocyclic nitrogen containing nucleus; and


(II)

wherein:

[R_5 represents an aliphatic group containing up to 18 carbon atoms, an aromatic group or a 5- or 6-membered heterocyclic group;] *R_5 is an aromatic group,* and a reducible noble metal salt of an aliphatic carboxylic acid, said organic reducing compound being present in an effective amount to reduce said noble metal salt and said heat pattern having a temperature of at least about 60° C. and sufficient to initiate said reduction.

PLANT PATENTS

GRANTED OCTOBER 2, 1979

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,462

ROSE PLANT—JAGUAR

Hendrik W. Oly, Aalsmeer, Netherlands, assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Dec. 27, 1977, Ser. No. 864,581

Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—28 **1 Claim**

1. A new and distinct variety of rose plant of the floribunda class, substantially as herein shown and described, characterized particularly as to novelty by the slightly darker red color of bud and bloom on the plant otherwise identical to the variety Mercedes.

PLANT PATENTS

GRANTED OCTOBER 2, 1973

[illegible]

PATENTS

GRANTED OCT. 2, 1979

ERRATA

For CLASS	See PATENT NO.
123–124 R	4,169,471
414–334	4,169,536
296–097 C	4,169,552
126–427	4,169,554
406–040	4,169,631
406–093	4,169,632
358–150	4,169,659
435–235	4,169,761
435–243	4,169,762
435–115	4,169,763
435–215	4,169,764
435–291	4,169,765
525–264	4,169,828
548–213	4,169,835
546–238	4,169,836
548–224	4,169,837
548–262	4,169,838
549–081	4,169,839
426–583	4,169,854
585–022	4,169,863
585–027	4,169,864
585–314	4,169,865
525–131	4,169,866
525–417	4,169,867
525–439	4,169,868
525–087	4,169,869
525–315	4,169,870
528–287	4,169,935
528–317	4,169,936

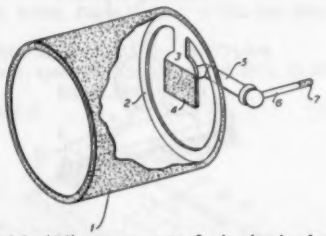
PATENTS

GRANTED OCTOBER 2, 1979

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,169,292
ARTIFICIAL MIDDLE EAR AND EAR CANAL PROSTHESIS
Johannes J. Grote, Bolwerkshof, Lerop, St. Odilienberg, Netherlands
Filed Nov. 14, 1977, Ser. No. 851,435
Claims priority, application Netherlands, Nov. 15, 1976, 7612657
Int. Cl.[2] A61F *1/18*
U.S. Cl. 3—1.9 **19 Claims**



1. An artificial middle ear apparatus for in vivo implantation comprising:

A. a first portion including;

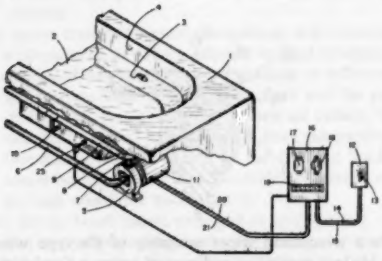
(a) a tube means of microporous biocompatible material for replacing removed portions of the bony external ear canal;

(b) a ring means of biocompatible material attached to said tube means for replacing the bony annulus of the ear drum and for supporting an ear drum membrane;

(c) a complex means of biocompatible material for replacing the hammer and anvil complex of a human patient; and

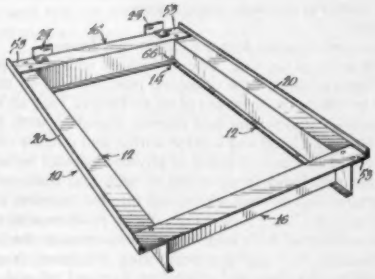
B. a second portion including; a piston means for replacing at least part of the stirrup of a human ear, said piston means having one end thereof operably coupled to said complex means and the other end thereof adapted to be attached to the remaining portion of the middle ear system.

4,169,293
HYDROTHERAPY VESSEL LEVEL CONTROL
Albert E. Weaver, Van Nuys, Calif., assignor to Chanso Corporation, Las Vegas, Nev.
Filed Feb. 8, 1978, Ser. No. 876,027
Int. Cl.[2] A47K *3/10, 3/00;* A61H *33/02*
U.S. Cl. 4—178 **7 Claims**



1. In a hydrotherapy system having a walled vessel, a water circulating pump, conduit means for conducting water from the vessel to the pump, and back to the vessel, and switch means for actuating the water pump, the improvement therein which comprises safety switch means for automatically shutting off the pump when the water level is below a predetermined level in the vessel comprising pressure sensing means located in a vessel wall below the operating water level in the vessel and responsive to the water level in the vessel, switch means coupled to the pressure sensing means for interrupting electrical current to the pump, and electrical circuit means for connecting the switch means to the pump.

4,169,294
PLATFORM BED FRAME
George M. Harris, 505 N. Lake Shore Dr., Chicago, Ill. 60611
Filed Mar. 6, 1978, Ser. No. 883,928
Int. Cl.[2] A47C *19/04;* F16B *5/07*
U.S. Cl. 5—200 R **12 Claims**



1. A platform bed frame for supporting mattress means in spaced relationship to a floor comprising: a pair of spaced parallel side plates, each side plate having substantially the same dimensions and including a wall portion having an upper edge and a lower edge and disposed in relation to the floor to provide upright support for said mattress means, a support portion for providing support for a peripheral part of said mattress means, the support portion integral with the upper edge of the wall portion and disposed generally transversely of and extending outwardly of the wall portion to provide support for said mattress means, a flange member extending generally upwardly of and integral with said support portion for preventing lateral movement of said mattress means with respect to said platform, and a foot portion integral with the lower edge of said wall portion for confronting the surface upon which the platform is situated, said foot portion extending generally inwardly of said wall portion and including a substantially planar portion integral with said wall portion and extending inwardly of said wall portion, a pair of longitudinally spaced end plates extending substantially transversely between said side plates, each end plate having substantially the same dimensions and including an intermediate portion having an upper edge and a lower edge and two ends and disposed in relation to the floor to provide upright support for said mattress means, an upper arm portion for supporting a peripheral portion of said mattress means, the upper arm portion integral with the upper edge of the intermediate portion, and a lower leg portion integral with the lower edge of the intermediate portion for confronting the surface upon which said platform is situated; the ends of said side plates and end plates being positioned in overlapping relationship with one another; and means for detachably securing each of said end plates to each of said side plates to form a generally rectangular platform and comprising opposing male members and a female member complementary to each of said male members on the overlapping ends of said side plates and said end plates, said male and female members being engageable with one another

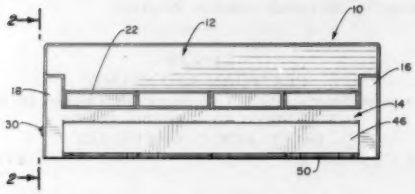
when the ends of said side plates and said end plates are positioned in overlapping relationship with one another.

4,169,295

MATTRESS STRUCTURE

Michael E. Darling, 110 Geneva Walk, Long Beach, Calif. 90803

Filed Oct. 13, 1977, Ser. No. 841,828
Int. Cl.[2] A47C *27/08*
U.S. Cl. 5—450 22 Claims



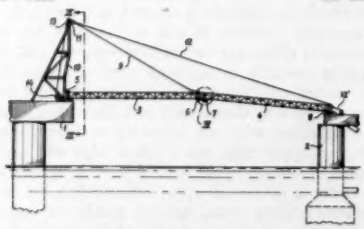
1. A mattress structure comprising:
a frame;
an interior chamber located within said frame;
an air mattress capable of being located within said interior chamber when in the collapsed position, said air mattress to be inflatable by means of an air blower, said air blower being located within said interior chamber, with said air mattress deflated and located within said interior chamber the said air mattress being in physical contact between an inner panel and an outer panel, with said mattress being deflated and stowed within said interior chamber the said outer panel being secured in a closed position with respect to said frame, with said inflatable mattress in the inflated condition the said mattress being displaced from said interior chamber and extending forward of said frame, with said mattress inflated the said inner panel being located substantially in the aforementioned closed position of said outer panel.

4,169,296

CONNECTING BRIDGE FOR PERSONNEL TO CONNECT TWO MUTUALLY MOVABLE MARINE STRUCTURES

Johannes Wipkink, Sassenheim, Netherlands, and Harald Johansen, Stavanger, Norway, assignors to Ingenieursbureau Marcon (Marine Consultants) B.V., The Hague, Netherlands and Peder Smedvig Shipowners, Stavanger, Norway

Filed Mar. 21, 1978, Ser. No. 888,807
Int. Cl.[2] E01D *1/00*
U.S. Cl. 14—71.1 21 Claims



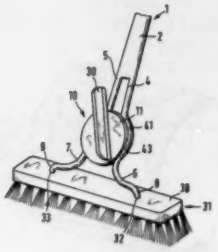
1. A personnel bridge for connecting first and second marine structures spaced apart in a horizontal direction by at least 20 meters and subject to relative movement therebetween, comprising:
(a) a first bridge span pivotally connected at one end to the first marine structure,
(b) a second bridge span pivotally connected at one end to the second marine structure, and
(c) means connecting the other ends of the first and second bridge spans together for mutual pivotal movement about a vertical axis in response to variations in the horizontal spacing between the first and second marine structures.

4,169,297

CLEANING-IMPLEMENT HANDLE SECURING MEANS

Georg Weihrauch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Heinrich Schlerf GmbH, Fed. Rep. of Germany

Filed Feb. 18, 1977, Ser. No. 769,969
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1976, 2606400; May 19, 1976, 2611683; Nov. 10, 1976, 2651259
Int. Cl.[2] A47L *13/11;* B25G *3/28*
U.S. Cl. 15—145 21 Claims



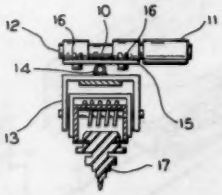
1. A clamping device for releasably securing a body to a handle having an end portion comprising two sprung branch arms in the form of a fork, the arms having bent portions and being securable in apertures of said body by means of the clamping device which is adapted to be positioned between and engage said branch arms and be movable between said branch arms for releasably securing the arms in the apertures of said body, said clamping device comprising peripheral groove means for receiving bent portions of said branch arms, the bends of said arms corresponding to the outline of the groove means in the region of the clamping device, and said device having a manual control member, the base of said groove means constituting a cam means and being provided with at least one flattened portion for locking the clamping device when the branch arms are securely clamped in the apertures of said body.

4,169,298

WINDSHIELD WIPER ADJUSTMENT ASSEMBLY

Gordon Smith, 9714 Hawthorn Ct., Sun City, Ariz. 85351

Filed Apr. 12, 1978, Ser. No. 895,802
Int. Cl.[2] B60S *1/40*
U.S. Cl. 15—250.33 14 Claims



1. In a windshield wiper assembly of the type wherein a wiper blade is pressed to and moved across a windshield, said wiper blade being held in a wiper retainer which is, in turn, joined at a connection to a drive arm, the improvement comprising:
means for selectively setting the angle at which said wiper

retainer is maintained with respect to said drive arm while said blade is being drawn across said windshield;

said means for selectively setting said angle including flap means which cooperate with said wiper retainer;

said means for selectively setting said angle further including adjustment means which cooperate with said flap means to set said angle.

4,169,299

APPARATUS FOR CLEANING PARTING SURFACES OF PLASTIC MOLDS

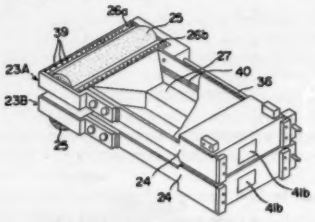
Kazuo Bandoh, Kyoto, Japan, assignor to Dai-Ichi Seiko Co., Ltd., Japan

Filed Mar. 7, 1977, Ser. No. 775,024

Claims priority, application Japan, Mar. 8, 1976, 51-25771

Int. Cl.[2] B29F *1/03*

U.S. Cl. 15—312 R **4 Claims**



1. An apparatus for cleaning plastic flash from mated parting surfaces of a mold between shots comprising:

(a) a carriage reciprocatably mounted on a support assembly for movement relative to the mold,

(b) drive means for reciprocating said carriage when the mold is open;

(c) a pair of cleaning heads mounted on said carriage so as to be moved between the opened mated parting surfaces by the reciprocation of said carriage, said pair of cleaning heads being arranged upon said carriage so that, when they are moved between said opened parting surfaces, one cleaning head contacts one of said parting surfaces while the other head contacts the other of said parting surfaces so as to remove flash adhered to the respective parting surfaces;

(d) each of said cleaning heads comprising:

(i) a head body provided with a parting surface facing opening,

(ii) means arranged around the opening, and connected to a compressed air source, adapted to blast air against the contacted parting surface to produce a difference in temperature between the plastic flash and the parting surface and, further adapted to form air cutains to prevent scattering of flash removed from the parting surface during said movement of the cleaning head, said means being provided with a plurality of nozzles or slits through which the air is blasted;

(iii) driven brush means arranged in said opening, a portion thereof projecting from said opening to contact and brush off the flash from the parting surface, and

(iv) dust collecting means connected to a suction source and having suction ports formed between said blasting means and brush means adapted to collect the flash removed by said blasting means or said brush means.

4,169,300

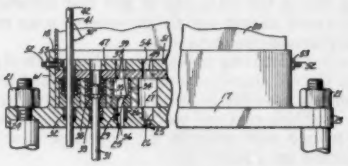
SPRING-BIASED, INSTANTLY UNLOADED KNIVES FOR PENETRATING AND TENDERIZING MEAT, AND HYDRAULICALLY CONTROLLED STRIPPING MEANS

Timothy J. McCullough, West Lake, Vermilion, Ohio 44089

Continuation of Ser. No. 677,796, Apr. 16, 1977, abandoned. This application Nov. 23, 1977, Ser. No. 854,375

Int. Cl.[2] A22C *9/00*

U.S. Cl. 17—25 **6 Claims**



1. In a meat tenderizing apparatus having a frame, support means for supporting meat to be tenderized, a ram, means mounted on said frame operatively associated with said ram for guiding said ram for vertical reciprocation toward and away from said support means, a plurality of module means disposed in said ram each said module means carrying a downwardly directed meat tenderizing knife, means effective to reciprocate said ram to cut said meat, a stripper carriage operably disposed to move in coordination with said ram to strip said meat on the upward stroke of said ram, and means for locking said stripper carriage in relation to said reciprocable ram, the improvement wherein said module means comprises a housing having first, second and third stepped coaxial bores, said first bore slidably accomodating a shaft from which said knife depends, said second bore having displaceably disposed therein plural balls instantly responsive to upward displacement of said shaft, and said third bore having displaceably disposed therein keeper means supported on said balls said keeper means having a passage through which said shaft may be slidably longitudinally translated, and spring biasing means with preselected spring constant to bias said keeper means against said balls so that a knife-retarding obstruction in said meat which exerts an upward force sufficient to displace said balls into said third bore essentially instantaneously releases said shaft so that there is no downward force on said shaft after it is released.

4,169,301

GILLING OR STRETCHING APPARATUS

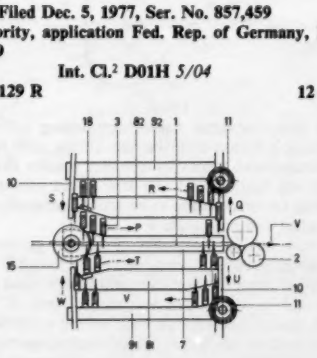
Hans Kaiser, Waldshut, Fed. Rep. of Germany, assignor to Hanseatischer Maschinenbau G.m.b.H., Hamburg, Fed. Rep. of Germany

Filed Dec. 5, 1977, Ser. No. 857,459

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1976, 2655079

Int. Cl.[2] D01H *5/04*

U.S. Cl. 19—129 R **12 Claims**



1. Gilling or stretching apparatus comprising

an upper set of individually movable pin bars and a lower set of individually movable pin bars,

means for guiding said upper set of pin bars successively in a first circuitous path and means for guiding said lower set of pin bars successively in a second circuitous path, each of said circuitous paths comprising a closed loop having a linear stretching run, a linear return run in the opposite direction, and transverse runs connecting said stretching run and return at each end, said stretching run and return run each having an entry end and an exit end, the transverse run at the entry end of said first circuitous path being axially aligned with the traverse run at the entry end of said second circuitous path,

drive means for driving said upper and lower sets of pin bars along said circuitous paths, with said upper and lower sets of pin bars travelling in the same direction in their respective stretching runs and travelling in opposite directions and toward each other in the transverse runs at their respective entry ends,

a plurality of cushioning members rotatably mounted at the entry end of said stretching run of the first and second cylindrical paths and positioned to be engaged by each pin bar of said upper and lower sets as each of said pin bars travels from the exit end of said return run to the entry end of said stretching run, whereby to retard the motion of said pin bar,

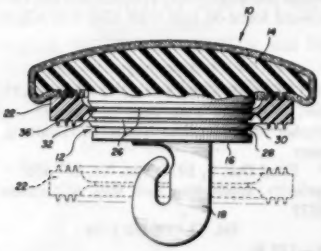
said cushioning members having a circumferential cushioning surface so disposed that the direction of travel of each pin bar at its point of engagement with said cushioning surface is at an acute angle to the tangent to said surface at said point of engagement, whereby to rotate said cushioning members, the upper set of pin bars engaging said cushioning members to rotate the latter in a first direction, and the lower set of pins bars engaging said cushioning members alternately to rotate the latter in a second opposite direction.

4,169,302

FABRIC COVERED BUTTON

Bruce A. Ferguson, 233 S. Quincy, Hinsdale, Ill. 60521

Filed Jun. 1, 1978, Ser. No. 911,447
Int. Cl.[2] A44B *1/12*
U.S. Cl. 24—113 R **2 Claims**



1. A fabric covered button comprising a button portion comprising a button head having on the rear face thereof a cylindrical-shaped stem of a diameter smaller than the dimensions of said button head and attachment means for securing said fabric covered button to an article integrally formed with the terminal end of said stem,

said stem having a plurality of annular grooves in spaced-apart relationship along the length thereof,

a piece of fabric draped over said button head and extended around its edge to the rear thereof, and

a flat washer-like locking ring having a top side, a bottom side and an interior diameter proportioned to forcibly fit over said stem and to lockingly engage with the respective ones of said grooves, an annular inwardly projecting flange of a thickness and length substantially corresponding with the thickness and length of the annular grooves in said stem, said annular flange lockingly engaging within the respective ones of said grooves to secure said locking ring to said stem,

the edges of said fabric at the rear of said button head being lockingly secured between the rear of said button head and said locking ring,

the underside of said button head being substantially flat and having a plurality of concentrically arranged circles of projecting pointed teeth formed thereon,

said locking ring further comprising a plurality of projecting teeth arranged in concentric circles so as to intermesh with said teeth on the underside of said button head to assist in securing said fabric to said button head, said teeth being provided on both the top and bottom side of said locking ring so that the latter is reversible, whereby said teeth on either said top side or said bottom side thereof can be intermeshed with said teeth on the underside of said button head to secure said fabric between the rear of said button head and said locking ring,

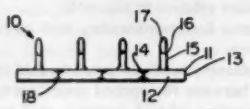
the peripheral edge of said stem at each of said plurality of annular grooves being tapered to form camming surfaces which engage with said flange on said locking ring to assist in forcibly fitting said locking ring to said stem.

4,169,303

FASTENING MATERIALS

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Filed Nov. 24, 1976, Ser. No. 744,504
Int. Cl.[2] A44B *13/00*
U.S. Cl. 24—204 **9 Claims**



1. A fastening material comprising:

a plurality of separately formed strips of fastening material with each of said strips formed of plastic resin and having a strip-like planar base portion defining a unitary molding and containing a row of fastening elements extending longitudinally along the strip and protruding outwardly from one face of said strip-like base portion wherein said fastening elements have a laterally extending portion located above the strip-like base portion, said base portion being wider than the width of said fastening elements,

each of said strips having its strip-like base portion in abutment along the longitudinal border portions thereof with respective longitudinal border portions of the strip-like base portions of adjacent strips whereby the fastening elements of all of said strips extend in the same direction and said rows thereof are parallel to each other,

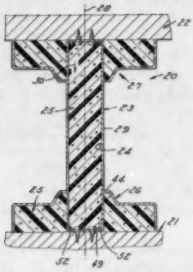
fusion bonding means securing said abutted base portions of said strips together along their abutting longitudinal border portions to provide an integral assembly of said strips which assembly defines a wider strip or sheet formation having a plurality of rows of said fastening elements extending parallel to each other across said assembly from the same side of and longitudinally along said wider formation of said material.

4,169,304

METHOD OF MAKING A BUILDING COLUMN

Burton A. Binder, 3093 Moon Lake Rd., West Bloomfield, Mich. 48033

Continuation-in-part of Ser. No. 726,825, Sep. 27, 1976, abandoned. This application Feb. 16, 1978, Ser. No. 878,419
Int. Cl.[2] B23P *17/00*
U.S. Cl. 29—155 C 5 Claims



1. A method of forming a decorative building column to withstand substantial compression loads along the longitudinal axis of the column without buckling comprising the steps of:

assembling a thin-walled hollow non-load-bearing shell having a longitudinal axis and a cross-sectional configuration of a first dimension from at least one sheet of relatively thin lightweight metal such that the edge portions of said sheet loosely interfit with one another when said assembly is complete;

filling said loosely assembled thin wall hollow shell with a foamable plastic material; and

expanding said foamable plastic material within said shell to laterally expand said cross-sectional configuration of said thin-walled hollow shell to a second dimension slightly greater than said first dimension to place said shell in laterally outward tension, said second dimension being greater than said first dimension by about two-four percent, the expanding of said plastic positively locking the edge portions of said sheet along a longitudinal seam and the foamable plastic material adhering to the interior walls of said shell;

whereby said column including the shell and the foamable plastic withstand compression loads along said longitudinal axis without buckling said shell and without crumbling said plastic.

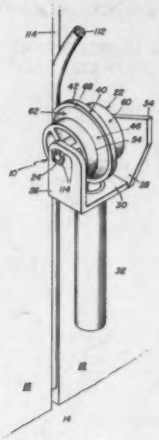
4,169,305

ROLLER FOR INSERTING FILLER MATERIAL IN CREVICES

Edward G. Kruszona, Schenectady, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed May 18, 1977, Ser. No. 797,972
Int. Cl.[2] B23P *19/02*
U.S. Cl. 29—235 10 Claims

1. A roller for inserting filler material to the proper depth in crevices comprising (a) a circular structure having a central circular section being at least 1/16 of an inch, but less than ¼ of an inch thick, a first and second truncated right angle cone section of a smaller diameter than said central section and appended on each side of said circular section where the bases of said truncated cone sections are adjacent to the central section and a third and fourth circular section of uniform thickness appended to the truncated part of said cone sections and having a diameter which is as large as the diameter of cones at their truncated sides and having a thickness of at least 1/16 of an inch wherein the center lines of said central section, said truncated cone sections and said third and fourth circular sections coincide and wherein said circular section is symmetrical on either side of the center lines passing through said central circular section, wherein the leading edge of the base of said truncated cone sections are located from ⅛ to 2/8 of an inch from the outer diameter of said central circular section wherein the angle of the cone sides to the base line of said truncated cone sections is 49° wherein the central circular section has a diameter of 3 inches and wherein said third and fourth circular sections have a uniform thickness of from 1/16 to 15/32 of an inch and have a uniform diameter of 2¼ of an inch; (b) a shaft passing through an opening in said circular structure so as to support said circular structure and allowing it to rotate, the axis of said shaft being coincident with the axis of said circular structure; (c) two support members supporting said shaft on both sides of said circular structure and allowing said circular structure to rotate about said shaft and (d) a base plate connected to said support members, such that circular structure is free to rotate and being supported by said support members and said base plate.

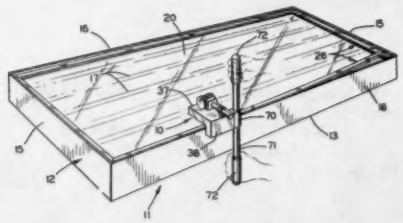


4,169,306

HAND TOOL

Wallace F. Krueger, Toledo, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Nov. 25, 1977, Ser. No. 854,506
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—239 5 Claims



1. A hand tool comprising: a base member having a bore therethrough, a lift element having a shank extending through said bore for free rotational movement therein about the axis of said shank, a blade secured to one end of said shank for movement therewith and extending generally radially therefrom, said blade being tapered radially outwardly toward the marginal edge thereof to form a sharp peripheral edge about a major portion thereof, means for biasing said blade away from said base member, means operatively connected to the other

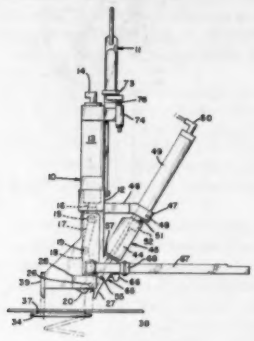
end of said shank for rotating said shank and thereby said blade, said last mentioned means including means for moving said lift element axially along said shank axis against said biasing means.

4,169,307

CLINCH TOOL AND METHOD

Donald H. Weinzimer, New York, and Edwin G. Krakauer, Roslyn Heights, both of N.Y., assignors to Kay Springs, Inc., Syosset, N.Y.

Filed Feb. 22, 1978, Ser. No. 880,045
Int. Cl.[2] B23P *11/00*; B21F *27/08, 15/06, 33/04*
U.S. Cl. 29—243.56 **9 Claims**



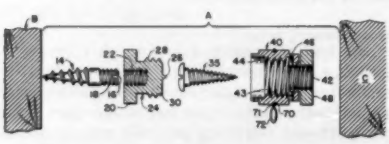
1. An automatic clinching tool for supplying, inserting, spacing and securing a connector component to form a united cross-grid and coil frame structure comprising: a body frame, means mounted on said body frame for spacing and retaining a cross-grid and coil to form a connector component-receiving chordal segmental space, said spacing and retaining means including a coil stop member and a rear guide member, said coil stop member having a coil-engaging lug and a rear stop member, a connector component-engaging closing jaw means in juxtaposition with said spacing and retaining means and having means for displacing said closing jaw means, a connector component supply means having a connector component slot means for guidably positioning individual connector components in a predetermined path, said connector component slot means being acutely angled relative to said body frame whereby said connector component is seated on said cross grid in said segmental space while said component-engaging closing jaw means engages said seated connector component to bend said connector component thereby locking said cross grid and said coil together.

4,169,308

SIGN MOUNTING METHOD

Robert W. Minogue, Hayward, Calif., assignor to Federal Signal Corporation, Chicago, Ill.

Filed Feb. 16, 1978, Ser. No. 878,363
Int. Cl.[2] G09F *7/18*
U.S. Cl. 29—407 **7 Claims**



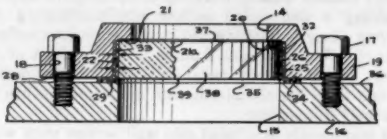
1. A process of mounting a sign at a sign back to a sign support comprising the steps of: providing a first mounting member having a sign attachment member on one end, and first coupling means on the other end; providing scribing means protruding from said first mounting member adjacent said first coupling means; fastening said sign attachment member to a sign back; providing a sign templet; impressing said sign back with said protruding first mounting member and scribe on said templet to mark said templet in registry with said first mounting member with a location of said first mounting member; providing a second sign mounting member having a second coupling means for engagement with the first coupling means of said first mounting member; mounting said templet to said sign support; placing through said templet on said sign support at said marked location said second sign mounting member having a second coupling for engagement with the first coupling means of said first mounting means; confronting said templet; and coupling said members to support said sign from said sign support.

4,169,309

METHOD OF MAKING A SIGHT GLASS ASSEMBLY

Charles E. Meginnis, 529-1/2 Nancy St., Charleston, W. Va. 25302

Continuation-in-part of Ser. No. 585,817, Jun. 11, 1975, abandoned. This application Jun. 27, 1978, Ser. No. 919,722
Int. Cl.[2] B23P *11/02*
U.S. Cl. 29—447 **15 Claims**



1. A method of making a sight glass assembly comprising forming a housing having an opening therethrough, provided with an annular wall, forming a lens having an annular peripheral wall provided with a diameter not greater than the diameter of said housing wall at predetermined equilibrium conditions, effecting a change in said predetermined equilibrium conditions sufficient to cause an increase in the radius differential of said lens and housing walls, inserting said lens in said opening while maintaining said change in conditions so that said lens wall is positioned in opposed relation to said housing wall, inserting an annular liner formed of a deformable material and having a thickness greater than the radius differential of said lens and housing walls under said predetermined equilibrium conditions, between said lens and housing walls, and maintaining said liner interposed between said housing and said lens while permitting said housing and said lens to return approaching said equilibrium conditions whereby said housing and lens walls will engage said liner to place said lens in uniform radial compression and form a fluid tight seal between said housing and said lens.

4,169,310

WIRE WRAPPING TOOL

Charles R. Murphy, Sunnyvale, Calif., assignor to Daniel G. Nilsson, Sunnyvale, Calif.

Filed Mar. 6, 1978, Ser. No. 883,436
Int. Cl.[2] H01R *5/00*; B21F *3/04*
U.S. Cl. 29—751 **8 Claims**

1. A wire wrapping tool comprising: a bit and a sleeve, said bit having an elongated body rotatably receivable in the sleeve

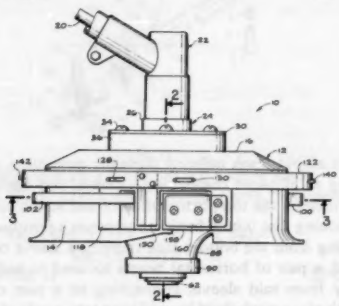
and means at one end of the body for releasably attaching the same to the chuck of a drive motor, there being a tubular tip rigid to the body at its opposite end, said tip having a recess in one side thereof, said body having a terminal-receiving bore extending thereinto fron. said tip and a groove in the side thereof in axial alignment with the recess, there being means on the bit at the junction between the recess and the groove for cutting the insulation of a wire in the recess and the groove as the bit rotates in the sleeve, said sleeve having a window alignable with the groove and an enlargement near the tip in radially spaced relationship to the recess when the bit is in the sleeve and when the window is aligned with the groove, and an elongated stationary bearing on the inner surface of the sleeve, said bearing having a shoulder near the cutting means for urging the wire into engagement with the cutting means as the bit rotates relative the sleeve.

4,169,311

VEGETATION CUTTING APPARATUS

Dale D. Evenson, 60 Buckskin La., Rolling Hills Est., Calif. 90274, and Virgil H. Stair, 15411 Cohasset St., Van Nuys, Calif. 91406

Filed Nov. 17, 1976, Ser. No. 742,963
Int. Cl.[2] A01D *55/18*
U.S. Cl. 30—276 **13 Claims**



1. A cutting apparatus comprising:
a housing rotatable about an axis;
a spool mounted within said housing having at least one line member would therearound and extending therefrom exteriorly of said housing for contacting and cutting vegetation by rapid circular movement exteriorly of said housing during rotation of said housing;
means connected to said housing for locking said spool against rotation of said spool relative to said housing and for unlocking said spool during rotation of said housing to permit said relative rotation and unwinding of said line member from said spool;
a support ring mounted on said housing; and
means secured to said support ring for cutting said line member when the speed of rotation of said support ring decreases relative to the speed of rotation of said line member.

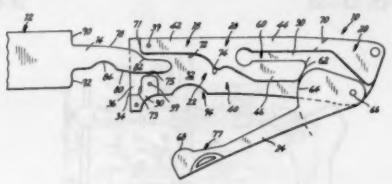
4,169,312

KNIFE WITH INTERCHANGEABLE BLADES

Alfred C. Mar, 5861 SW. Benfield Ct., Lake Oswego, Oreg. 97034

Filed Aug. 28, 1978, Ser. No. 937,187
Int. Cl.[2] B26B *1/00*
U.S. Cl. 30—337 **4 Claims**

1. A knife accommodating interchangeable blades comprising
a blade having a tang extending from the base thereof,
an elongate handle having a front region and an opposed back region, said handle including a tension fork having an axially-extending base forming at least a portion of said front region, and outer and inner arms attached to said base and extending substantially axially therefrom, said outer arm forming at least a portion of said back region,
an elongate lever having opposed pivot and locking points, mounted at its pivot point in the back region of the handle for swinging movement toward and away from locked position in which the lever is substantially axially aligned with said handle,
lever locking means including a contact surface defined on said inner arm and a cammed surface defined on said lever



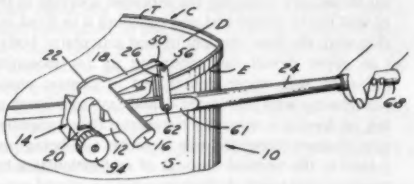
adjacent its pivot point, the latter surface being dimensioned to engage slideably and forceably said contact surface, and force said inner arm toward said outer arm, as said lever is swung toward its locked position, to lock said lever in locked position,
a cavity defined within said handle at the front region thereof, dimensioned to receive said tang therein, and means defined on said tang for cooperating with said locking point to secure said tang axially within said cavity, when said lever is in its locked position.

4,169,313

DRUM DEHEADER

Elmer T. Thurmond, Jr., Miami, Fla., assignor to Equipment Company of America, Hialeah, Fla.

Filed May 3, 1978, Ser. No. 902,480
Int. Cl.[2] B67B *7/36*
U.S. Cl. 30—432 **16 Claims**



1. A drum cutter for use in opening an end of a drum provided with a drum chime comprising a base engageable with the outside surface of the drum, said base having at one end an upstanding lug engageable with the top of the drum chime and having at the other end a shoulder engageable with the underside of the drum chime, a head provided with an integral handle which extends in a direction away from said base and the drum, pivot means having a first axis for mounting said head on said base, a blade secured to said head for cutting the end of the drum adjacent the drum chime, an elongated operating lever pivotally mounted on one end to said base about a second axis and linkage means connecting an intermediate portion of said lever to said head whereby a person may grip the handle with one hand and apply a force to said lever with the other hand thereby causing said head to pivot and said blade to be lowered into cutting engagement with the end of the drum, said handle and said lever being generally perpendicular, said handle being elongated and having a series of protuberances along one edge thereof forming a hand grip, and said blade being removably secured to said head by set screws and

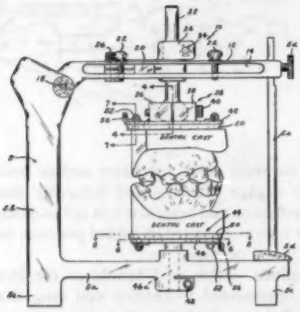
being located in a plane which is generally perpendicular to said handle.

4,169,314

DENTAL ARTICULATOR FOR MOUNTING CASTS WITHOUT PLASTER

Roger W. Mercer, 1340 Arlington Dr., Fairborn, Ohio 45324, and Louis E. Hay, 847 Woodhill Rd., Dayton, Ohio 45431

Filed Sep. 27, 1977, Ser. No. 837,002
Int. Cl.[2] A61C *11/00*
U.S. Cl. 32—32 **20 Claims**



1. A dental articulator for mounting and supporting a matched upper and a lower dental cast having a threaded aperture in the base of said dental casts, said articulator comprising:

(a) an articulator body having a base element and at least one vertical element extending upward from said base element;

(b) a lower dental cast mounting jig supported by the base element of said articulator body; said lower dental cast mounting jig having a screw member extending upward for threadably engaging the threaded aperture in the base of said lower dental cast and retaining it in fixed relationship with the base element of said articulator body; and,

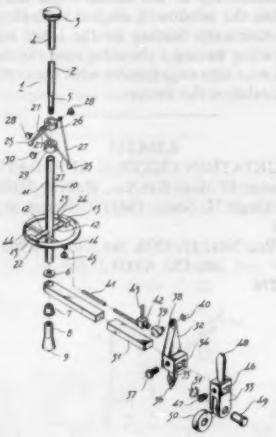
(c) an upper dental cast mounting jig for mounting and adjusting said upper dental cast in centric anatomical relationship with said lower dental cast; said upper mounting jig having a normally horizontal frame member with spaced apart elongated side elements and being pivotally joined to the vertical element of said articulator body to be superimposed with the base element of said articulator body; an elongated transverse bar member spanning said side elements of said frame member and being retainably slidable fore and aft with the side elements of said frame member for providing anterior-posterior movement of said upper dental cast in relationship with said lower dental cast; a lateral movement block member longitudinally and retainably slidable on said transverse bar member for providing lateral movement of said upper dental cast in relationship with said lower dental cast, and having a vertical bore therethrough spaced to be adjacent and substantially perpendicular to said transverse bar member; a vertical movement member retainably movable in the vertical bore of said lateral movement block member for providing vertical movement of said upper dental cast in relationship with said lower dental cast; a dependent wobble plate assembly operably attached to said vertical movement member for providing retainable rotational and retainable canting movement of said upper dental cast in relationship with said lower dental cast; and, a dental cast mounting plate detachably joined to said wobble plate and carrying a downward extending screw element for threadably engaging the threaded aperture in the base of said upper dental cast and retaining it in fixed relationship with said dental cast mounting plate.

4,169,315

ELLIPSOGRAPH

Lin Sin, 135-2, Lane 120, Hu-Lin St., Taipei, Taiwan

Filed Jul. 21, 1978, Ser. No. 926,857
Int. Cl.[2] B43L *11/04*
U.S. Cl. 33—30 C **9 Claims**



1. An ellipsograph utilizing dynamic projection method for drawing an ellipsoid comprising a central rod having a circle cap formed on the top portion thereof and screw connected to a positioning disc which further comprises a positioning needle extending from the bottom face thereof; a sleeve on said central rod; a pair of horizontal beams secured to and extending radially from said sleeve, connecting to a pair of supports respectively; a circle held by said supports; a pair of guide balls connected through links to a ring of said sleeve by screws; a rotational rod engaged with said sleeve having a pen stand and a roller seat equipped thereon; and a major axis rod slidable in a guide tube which is eccentrically secured to said circle; said major axis rod further comprises a connector by which to connect with a trap of said pen stand forming a rotatable joint; so as to draw an ellipsoid path when said rotational rod is pushed to move.

4,169,316

VIBRATION RESISTANT MEASURING DEVICE

Alfons Ernst, Traunreut, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

Filed Mar. 6, 1978, Ser. No. 883,788
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1977, 2712422
Int. Cl.[2] G01B *11/04*
U.S. Cl. 33—125 C **12 Claims**

1. In a position measuring device having a measuring scale, first and second spaced guide surfaces, a scanning unit, and means for positioning the scanning unit with respect to the guide surfaces for guiding the scanning unit along the scale, the improvement comprising:

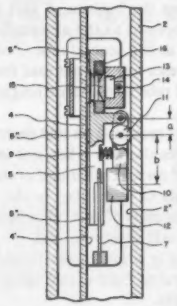
a compensating mass;

means for connecting the compensating mass to the scanning unit;

means, mounted on the connecting means, for contacting the first guide surface; and

means for biasing the contacting means into contact with the first guide surface, said biasing means acting to urge the

scanning unit into contact with the second guide surface, and said compensating mass arranged to reduce the tendency of the scanning unit to lift off the second guide surface when acceleration is applied to the guide surfaces.

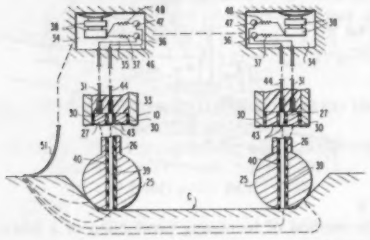


4,169,317

PRECISION ELECTRICAL CALIPERS

Miroslav B. Boné, 11457 60th Terrace North, Seminole, Fla. 33542

Filed Sep. 12, 1978, Ser. No. 941,476
Int. Cl.[2] G01B *7/02*
U.S. Cl. 33—148 H **13 Claims**



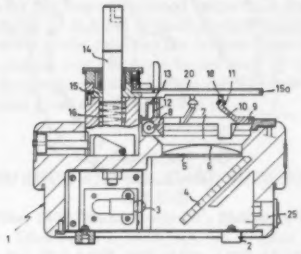
1. A precision measuring calipers for machinists and the like comprising spreadable and retractable caliper legs and means connected with the caliper legs to finely adjust their relative positions during use, a pair of conducting elements on at least one leg of the calipers in telescopically interfitting relationship and adapted for engagement with parts of a machined workpiece to be measured, the outer one of said pair of conducting elements being spherically formed with precision at least in part and the interior one of the conducting elements including a contact tip exposed through the spherical surface of the outer conducting element, the other leg of the calipers having at least a single machined workpiece engaging element thereon, said conducting elements being electrically insulated from each other and from the leg of the calipers on which they are carried, at least a pair of electrically powered light emitting elements on the calipers remotely from said conducting elements and being electrically connected with the conducting elements, and an electrical grounding means for the calipers.

4,169,318

APPARATUS FOR THE PREPARATION OF EYEGLASS LENSES, PRIOR TO THE SHAPING AND/OR BEVELLING THEREOF

Antonio C. Cortés, Hospitalet de Llobregat, Spain, assignor to Proptis, S.A., Spain

Filed Oct. 12, 1977, Ser. No. 841,440
Claims priority, application Spain, Oct. 23, 1976, 223.977; Jun. 8, 1977, 229.141
Int. Cl.[2] G01B *1/00*; G02C *7/02*
U.S. Cl. 33—174 A **7 Claims**



1. Apparatus for the preparation of eyeglass lenses, prior to the shaping and/or bevelling thereof, said preparation consisting of marking or attachment of a holding member to said lens, characterized in that it comprises:

a body,

a cavity in the upper horizontal surface of said body,

an annular member adapted to be located in said cavity and capable of rocking in any direction, said annular member having at least three arms adapted for supporting a lens extending from the upper surface thereof,

means for directing a concentrated light beam through the cavity,

an upright column attached to said body,

an arm mounted for up and down movement to said upright column and having an aperture over said cavity, three bosses extending from the lower face thereof and disposed, preferably, as the apexes of an equilateral triangle, said bosses being adapted to hold the lens together with the arms of the annular member,

a spring urging said arm in a downward direction,

means for lifting said arm against the urging of said spring,

a transparent plate supported by said arm and capable of rotation around said upright column, said plate having a millimeter reticle,

means mounted to the arm and to the plate suitable for ensuring a particular relative position between the two,

an upright support column and a guide post attached to said body,

and interchangeable means for the preparation of a lens prior to shaping thereof mountable on the upright support column and the guide post.

4,169,319

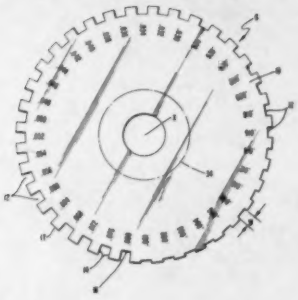
METHODS AND APPARATUS FOR MEASURING THE THICKNESS OF WET FILMS

Paul N. Gardner, Pompano Beach, Fla., assignor to Paul N. Gardner Company, Fort Lauderdale, Fla.

Filed Sep. 6, 1978, Ser. No. 940,299
Int. Cl.[2] G01B *5/18*
U.S. Cl. 33—169 F **7 Claims**

1. A gauge for measuring the thickness of a wet film on a surface, comprising a substantially circular disc having a thickness in the range of from 0.032 to 0.125 inches, said disc including a plurality of circumferentially spaced, calibrated measuring notches disposed around the outer periphery thereof, said notches each including a pair of generally radially extending side walls and a generally circumferentially extending end wall

connecting radially inner ends of said side walls, radially outer ends of said side walls extending to the outer periphery of said disc and being spaced apart to form an open end of each notch, the radially outer end of a side wall of each notch being circumferentially spaced from the radially outer end of the nearest side wall of an immediately adjacent notch to form a gener-



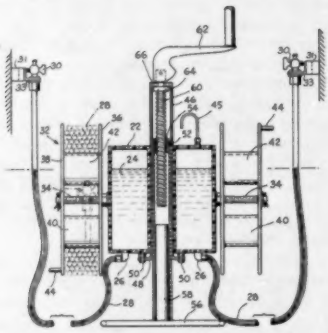
ally circumferentially extending face between such adjacent notches, the depths of said notches being graduated, said disc being rotatable about a central axis thereof along the film-containing surface so that at least some of said measuring notches travel through the film and become wetted thereby to measure the film thickness.

4,169,320

LEVELING DEVICE

Lewis L. Bennett, 6 Woodleigh Ave., Taylors, S.C. 29687

Filed Nov. 10, 1977, Ser. No. 850,261
Int. Cl.[2] G01C *5/04*
U.S. Cl. 33—367 **5 Claims**



1. A portable apparatus providing a plurality of reference points for use in simultaneously leveling objects such as the corners of foundations for house trailers and the like which extend over large areas comprising:

(a) a cylindrical reservoir having an axially disposed vertically extending bore,

(b) a stand supporting said reservoir in a vertical position including:

(i) a horizontal base portion, and

(ii) a post extending upwardly from said base portion into said vertical bore of said reservoir,

(c) a liquid carried in said reservoir,

(d) vent means carried on top of said reservoir venting said reservoir to the atmosphere,

(e) an elongated transparent tube having one end extending from the bottom of said reservoir and having another end opened to the atmosphere,

(f) fluid carried in said tube communicating with said fluid in said reservoir so that the level that said fluid extends upwardly in said tube is the same height as the liquid level in said reservoir,

(g) a second elongated transparent tube having one end extending from the bottom of said reservoir and having another end opened to the atmostphere,

(h) fluid carried in said second tube communicating with said fluid in said reservoir so that said fluid extends upwardly in said second tube to the same height as the liquid level in said reservoir,

(i) reels rotatably mounted on said reservoir for winding said elongated tubes thereon when not in use,

(j) means carried on said other end of said tubes for attaching said other ends of said tubes to the object being leveled with said other ends of said tubes being carried above said fluid level in said reservoir, and

(k) means manually adjusting the height of said reservoir for raising the level of fluid in said tubes and said reservoir to a desired height,

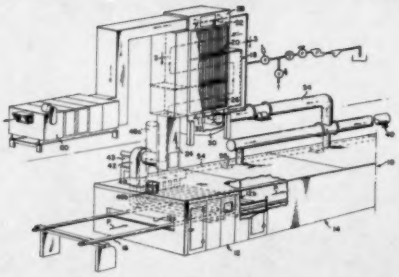
whereby said elongated tube can be readily moved from one place to another while said fluid level therein remains at the same height.

4,169,321

WASTE HEAT RECYCLING SYSTEM

John A. Nichols, Stoughton, Mass., assignor to Airtech Systems, Inc., Stoughton, Mass.

Division of Ser. No. 696,738, Jun. 16, 1976, Pat. No. 4,132,011.
This application Apr. 19, 1978, Ser. No. 897,665
Int. Cl.[2] F26B *3/04*
U.S. Cl. 34—23 **5 Claims**



1. The method of increasing production of a fabric dryer located within a room without increasing energy consumption, comprising:

heating the fabric at high temperature with main dryer air to drive off entrained polluting particles and volatile fluids from the fabric to produce a hot exhaust of air, particles and fluids,

discharging the hot exhaust along a first path,

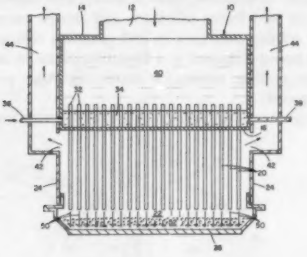
feeding fresh air along a second path that intersects said first path but remains isolated therefrom to heat the fresh air by the hot exhaust without intermixing the fresh air and hot exhaust, removing the fluids and entrained particles from the hot exhaust by condensing while cooling with said fresh air, and

directing only the fresh air heated by hot exhaust against the fabric prior to heating the fabric by main dryer air to said high temperature whereby the fabric is separately preheated prior to being heated to said higher temperature without consuming additional energy from external of the dryer and providing shorter production times within the dryer.

4,169,322
MATERIAL TREATMENT

Walter E. Buske, Amesbury, Mass., assignor to Wolverine Corporation, Methuen, Mass.

Filed Mar. 20, 1978, Ser. No. 888,213
Int. Cl.[2] F26B *17/26*
U.S. Cl. 34—57 A 9 Claims

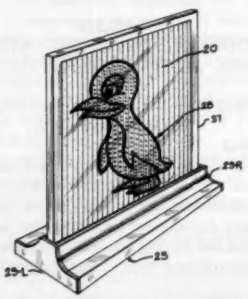


1. Particulate treatment apparatus comprising
structure defining a particle treatment zone including a conveyor defining an imperforate lower particle treatment zone boundary,
a chamber above said particle treatment zone arranged to receive a body of liquid,
means for creating a zone of vapor within said chamber above said body of liquid,
an array of nozzle tubes extending through the lower wall of said chamber and disposed along the length and across the width of said treatment zone, the upper ends of said nozzle tubes extending above the level of liquid in said chamber and the lower ends of said tubes being disposed adjacent said imperforate transport surface of the conveyor,
and means for flowing vapor from said vapor zone through said tubes downwardly against said conveyor surface for fluidizing particles on said conveyor with concurrent vapor exchange so that the particulate material entrains a substantial amount of vapor as it is transported through the treatment zone.

4,169,323
MEANS FOR PRODUCING MULTI-COLORED HOBBY CRAFT DESIGNS

Robert W. Engel, 2745 Provincetowne, Toledo, Ohio 43613

Filed Nov. 3, 1977, Ser. No. 848,292
Int. Cl.[2] B44D *2/00;* B05D *1/30*
U.S. Cl. 35—26 5 Claims



1. For use in making a multi-colored sand art hobby craft item, the combination comprising
(a) a unitary array consisting of a plurality of substantially transparent tubes having substantially identical dimensions and having open upper ends,
(b) means for supporting said array of tubes extending vertically with their lower ends closed,
(c) one vertical face of said array of tubes having imprinted thereon an outline design defining individual specific areas to be colored differently, including areas for one color located below areas for other colors and areas for one color surrounded by areas for other colors, the outline of the design being opaque and the lines thereof being of different thicknesses as necessary to mask the interfaces of vertically superposed quantities of sand having different colors for the areas above and below such lines, and
(d) a plurality of supplies of sand of various colors selected to conform to the colors of the various areas of the design to be poured into the open upper ends of said tubes in varying quantities and sequence for filling in each of the individual portions of the design.

4,169,324
SOCK AND SHOE AND SOCK AND SHOE FASTENING MEANS

Don W. Gibbs, 3452 Monte Verde Dr., Holladay, Utah 84109

Filed Jan. 31, 1978, Ser. No. 873,921
Int. Cl.[2] A43B *1/00, 1/04;* A41B *11/00*
U.S. Cl. 36—83 17 Claims

1. A sock for a foot comprising a toe region, a heel region, optionally a tube, a collar defining an opening, and a Y-shaped flap protruding from the rear of the sock at or above the heel region for fastening to the outside of the rear or heel region of a shoe to prevent the sock from sliding or riding into the shoe, the upper two legs of the flap being joined to the sock and the lower single leg being free for fastening to the shoe.

4,169,325
SKI BOOT

Georges P. J. Salomon, Annecy, France, assignor to Etablissements Francois Salomon et Fils, Annecy, France

Filed Jan. 24, 1977, Ser. No. 761,764
Claims priority, application France, Jan. 27, 1976, 76 02167
Int. Cl.[2] A43B *3/00*
U.S. Cl. 36—117 14 Claims

1. A ski boot comprising
(a) an outer shell element;
(b) a single-walled lining element defining, in conjunction with said shell element, a cavity adapted to receive a filler;
(c) means (3, 4; 10, 11; 12; FIGS. 5 to 13) for sealing said

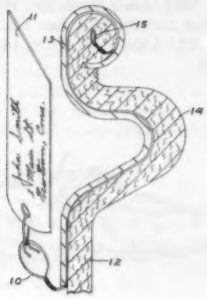
cavity, said sealing means being interposed between said shell element and said inner lining element to retain said filler and having a contour delimiting the extent of said sealed cavity;

(d) said sealing means comprising means (14; 20–26) for removably connecting said sealing means to at least one of said shell and inner lining elements, whereby said inner lining element is removably mounted in said shell element.

4,169,326
CONTAINER WITH IDENTIFICATION TAG SECURED TO THE TOP CHIME AND ITS METHOD OF MANUFACTURE

Robert H. Reese, Wheaton, and Gerhardt Facko, Blue Island, both of Ill., assignors to Greif Bros. Corporation, Delaware, Ohio

Filed Jan. 5, 1977, Ser. No. 757,020
Int. Cl.[2] G09F *3/00*
U.S. Cl. 40—306 **7 Claims**



1. An improved drum comprising:

a. a shell defining the side walls of the drum and having an upper end and a bottom closed end;

b. a chime strip attached to one of the ends of the shell; and

c. a loop of elongated material adapted to receive a data bearing tag or label secured between the shell and the chime strip, said chime strip being at the top of the shell and beaded with the associated parts of the shell, the loop being embedded in the top beaded chime construction.

4,169,327
SIGN BOX STRUCTURE

Johann Stilling, A1001,1141 Royal York Rd., Islington, Canada

Filed Dec. 9, 1977, Ser. No. 859,091
Int. Cl.[2] G09F *13/04*
U.S. Cl. 40—549 **9 Claims**

1. A sign structure having a housing, of predetermined length and breadth, and a moveable front panel of corresponding length and breadth, and which comprises:

at least four elongated linear housing side members providing structurally rigid housing side walls;

at least four housing corner members respectively interconnecting adjacent ones of said housing side members in spaced apart relation;

first supporting formations formed integrally on said linear side members and extending forwardly thereof, and said housing corner members being free of said supporting formations thereby defining discontinuous supporting formations around said housing;

housing locking members securing each of said housing corner members adjacent ones of said housing side members;

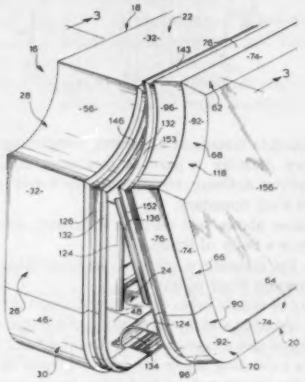
at least four elongated linear frame members co-extensive with corresponding ones of said housing side members and providing a structurally rigid frame for said front panel at least four frame corner members respectively interconnecting two adjacent ones of said frame members and co-extensive with said housing corner members;

second supporting formations formed integrally with said linear frame members and extending rearwardly thereof, and said frame corner members being free of said supporting formations thereby defining discontinuous second supporting formations around said front panel;

frame locking members securing each of said frame corner members to adjacent ones of said frame members;

recesses in said frame members and similar recesses in said frame corner members in end abutting relation, such recesses being disposed in a common plane to define a continuous endless recess for receiving edge portions of a front panel;

seal flange means formed on said housing side members, and



similar seal flange means formed on said housing corner members in end abutting relation to form a continuous endless seal flange means;

cooperating sealing means formed on said frame side members, and similar sealing means formed on said frame corner members in end abutting relation to form a continuous endless sealing means in registration with said seal flange means;

a resiliently compressible continuous endless seal disposed between said seal flange means and said sealing means for sealing between said housing and said front panel, and,

releasable securing means releasably maintaining said first supporting means and said second supporting means in engagement with each other thereby securing said front panel on said housing with said seal being compressed to restrict the passage of moisture into said housing.

4,169,328
MODULAR DISPLAY SIGN SYSTEM

William G. Frick, Jr., 2240 White Oak Dr., Northbrook, Ill. 60062

Filed May 23, 1977, Ser. No. 799,380
Int. Cl.[2] G09F *7/02*
U.S. Cl. 40—612 **9 Claims**

1. A modular display sign system which comprises:

assorted label means for adhesive affixation of a variety of visual communications to said display sign system;

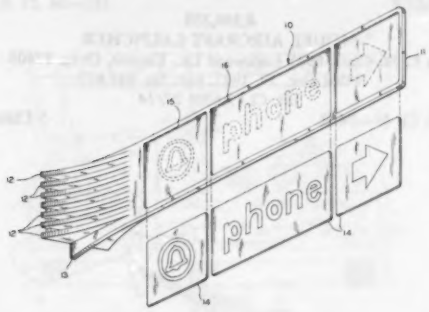
a substantially rectangular panel member having a first and second end and having alternating square and rectangular indentations of equivalent height longitudinally positioned therein,

said square indentations being positioned proximate said first and second ends of said panel member,

said square indentations enabling placement of square label means describing a directional arrow, alternatively in a horizontal or vertical position as desired, thereby graphically and structurally communicating, in combination

with said rectangular panel member, directional information;

strut means integrally formed at said first end of said panel



means for supporting said panel member in a desired operative position; and

fastening means for the securement of said panel member to a desired point of use.

4,169,329

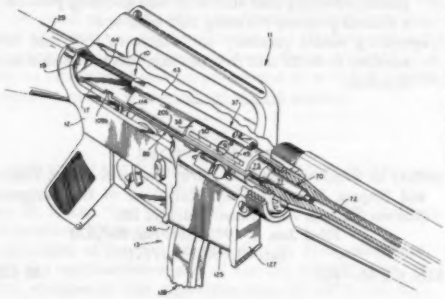
WEAPON CONVERSION APPARATUS

Maxwell G. Atchisson, 55 Old Yellow Springs Rd., Fairborn, Ohio 45324

Filed Sep. 6, 1977, Ser. No. 830,607

Int. Cl.[2] F41C *11/00*

U.S. Cl. 42—16 **16 Claims**



1. Conversion bolt assembly apparatus for converting a firearm, having a receiver, a regular bolt assembly, a side ejection port, and a chamber which is chambered for cartridges of a first caliber, to fire cartridges of a second caliber by replacing the regular bolt assembly of the firearm, comprising,

a backplate having means which engages a portion of the firearm so as to orient said backplate in predetermined relation to the receiver of the firearm;

a receiver plate attached to and extending forwardly from said backplate and including a pair of spaced apart parallel rails which terminate at remote ends a distance from said backplate;

a barrel assembly carried by said unsupported ends of said rails;

said barrel assembly having means which is externally configured to fit in the chamber of the firearm and having a cartridge receiving chamber to receive a cartridge of said second caliber;

a bolt guided by said rails for reciprocal movement between a forward position at said chamber of said barrel assembly and a rearward position;

extractor means carried by said bolt and operative to withdraw a cartridge from said cartridge receiving chamber of said barrel assembly; and

said rails being in a plane which is tilted relative to horizontal as said conversion bolt assembly is oriented within the firearm, so that the side ejection port of the firearm is not obstructed by said receiver plate.

4,169,330

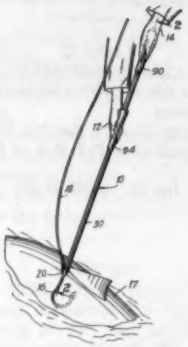
FISHING GAFF

Jerry Schnur, 123 Lorraine Gate, East Meadow, N.Y. 11554

Filed Sep. 7, 1977, Ser. No. 831,168

Int. Cl.[2] A01K *81/00*

U.S. Cl. 43—5 **10 Claims**



1. A gaff for use by a fisherman, comprising a member carrying a hook for engagement with a fish, a pole, means mounted on the pole at one end for anchoring the member to the pole, and means carried by the pole for releasing the anchoring means to release the member and its hook from its anchorage with the pole, the releasing means having manipulating means positioned on the pole at a position removed toward the other end of the pole from the position of the anchoring means, the manipulating means providing means for actuation by the fisherman after a fish has been engaged by the hook.

4,169,331

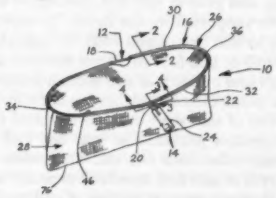
NET REPLACEMENT UNIT

Thomas E. Baker, 4000 Davana Rd., Sherman Oaks, Calif. 91423

Filed May 15, 1978, Ser. No. 905,806

Int. Cl.[2] A01K *75/00*; **B01D** *35/00*

U.S. Cl. 43—11 **10 Claims**



1. For use with an open ring-type frame formed from a material having a circular cross-section, a net replacement unit which comprises:

a resiliently-deformable, tubular cover bendable to conform to the shape of said frame, said cover having an interior surface defining a substantially ovate bore coextensive with said cover, said bore having opposing broad and narrow sides in cross-section and communicating through a slot coextensive therewith defined by said cover along

said narrow side of said bore, said slot and said bore being sized to receive said frame, first and second ribs substantially coextensive with said bore and having free ends extending upwardly into said bore from opposing surfaces of said interior surface adjacent to said slot, said first rib oriented at an acute angle between about 35 degrees and about 90 degrees with respect to said surface from which it extends, said second rib being oriented at about 85 degrees to about 95 degrees to said surface from which it extends, said first and second ribs extending into said bore a distance sufficient to bias said frame against said interior surface along said broad side of said bore when received by said bore; and

a net having an open end defined by an edge integral with said cover and depending therefrom.

4,169,332

CRANK ASSEMBLY

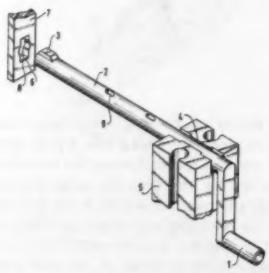
Artur Fischer, Weinhalde 34, D-7244 Waldachtal 3 (Tumlingen), Fed. Rep. of Germany

Filed Aug. 22, 1977, Ser. No. 826,461

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1976, 7626280[U]

Int. Cl.[2] A63H *33/06*

U.S. Cl. 46—17 **11 Claims**



1. A toy assembly kit for assembling a crank unit, comprising a first supporting structural member having an undercut groove which includes a wider section and a narrower section; a second supporting structural member adapted to be spaced from said first structural member in a first direction and having an opening which is provided with a transverse enlargement in its periphery extending in a direction transverse to said first direction; and a rotatable crank element including an elongated rotatable shaft member having an axis extending in said first direction and two axially spaced ends, said shaft member being insertable into said groove and said opening of said structural members to be supported by the latter, by movement in said first direction so that one of said ends first passes through said undercut groove of said first structural member and thereafter passes through said opening of said second structural member, said rotatable crank element further having a handle provided at the other end of said shaft member to rotate the latter, and only one projection provided at said one end of said shaft member so that when said one end first passes through said undercut groove of said first structural member said projection passes through said narrower section of said undercut groove, and when thereafter said one end of said shaft member passes through said opening of said second structural member said projection passes through said enlargement of said opening, said shaft member being movable between a first position in which said projection extends axially outwardly beyond said second structural member and is circumferentially offset from said enlargement of said opening so that said projection can abut against said second structural member from outside whereby said shaft member can rotate about said axis but cannot be inwardly axially displaced, and a second position in which said projection is lodged in said enlargement of said opening of said second structural member whereby said shaft member becomes arrested against undesired rotation about said axis.

4,169,333

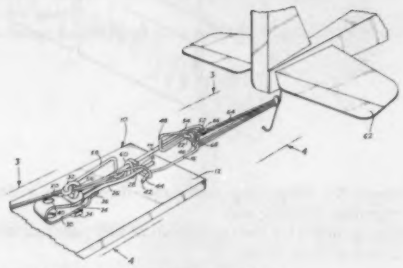
MODEL AIRCRAFT LAUNCHER

Oba L. St. Clair, 5035 Larkwood La., Eugene, Oreg. 97405

Filed Dec. 19, 1977, Ser. No. 861,677

Int. Cl.[2] A63H *27/14*

U.S. Cl. 46—74 R **5 Claims**



1. A model aircraft launcher comprising

an elongate mounting member,

a spring/gripper arm defining a gripping crook swingably attached to said mounting member for spring-action swinging between a gripping position wherein said crook is adapted to hold an aircraft by a line attached both to the crook and to the aircraft, and a releasing position wherein such a line is released from the crook,

a release member mounted for movement between a first position holding said arm in its said gripping position and a second position releasing said arm, and

operating means remotely activatable to shift said release member from its said first position toward its said second position.

4,169,334

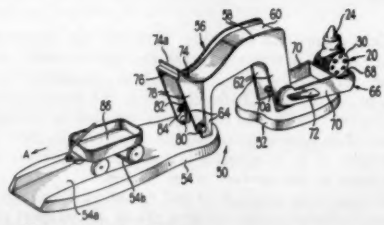
ROLLING TOYS

Jeffrey D. Breslow, Highland Park; Wayne A. Kuna, Elmhurst, and Eugene Jaworski, Park Ridge, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Jan. 6, 1978, Ser. No. 867,523

Int. Cl.[2] A63H *11/10*

U.S. Cl. 46—103 **36 Claims**



1. A rolling toy comprising:

a pair of wheels mounted on a common axle with inside faces of said wheels in spaced apart relation;

a body mounted for free rotation on said axle between said inside faces including a head portion projecting upwardly above said wheels and a lower portion below said axle;

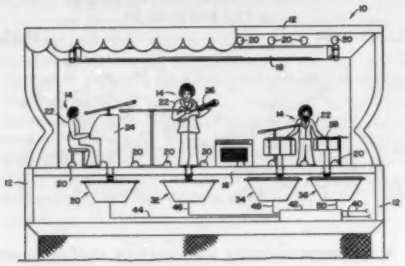
weight means for said lower portion for maintaining said head portion in an upright position as said wheels rotate; and

connecting means on the exterior of said wheels for connecting the rolling toy to another like toy in cooperative engagement for movement therewith.

4,169,335
MUSICAL AMUSEMENT DEVICE

Manuel Betancourt, 424 Central Ave., Apopka, Fla. 32704

Filed Jul. 5, 1977, Ser. No. 812,986
Int. Cl.[2] A63H *3/33*
U.S. Cl. 46—144 9 Claims



1. A musical amusement device of the type displaying movable, sound-responsive figures, said amusement device comprising: a support frame including platform means mounted thereon, at least one figure having a predetermined configuration and movably mounted on said platform means; at least one speaker mechanically interconnected to said one figure, said one speaker electrically interconnected to frequency selector means, said frequency selector means interconnected between a sound source and said one speaker; connecting means movably interconnecting said one speaker to said one figure and comprising support means, a flexible attachment disposed in interconnecting relation between said speaker and said support means, said flexible attachment disposed in vibration-responsive relation to said speaker and in driving relation to said support means, said support means having a shaft having one end connected to said flexible attachment and movably interconnected to said one speaker through said platform means for attachment to said one figure; said one figure movable in response to vibration of said support means as sound of a predetermined frequency is transmitted to said speaker.

4,169,336
STRETCHABLE FIGURE EXHIBITING SLOW RECOVERY

James O. Kuhn, New York, N.Y., assignor to CPG Products Corporation, Minneapolis, Minn.

Continuation of Ser. No. 705,966, Jul. 16, 1976, abandoned, which is a continuation-in-part of Ser. No. 665,469, Mar. 10, 1976, abandoned. This application Aug. 22, 1977, Ser. No. 826,293
Int. Cl.[2] A63H *3/00*
U.S. Cl. 46—156 7 Claims

1. A toy figure having a shape including a limb or body part which may be moved from one position to another manually and, when released, will slowly return to the original position comprising (1) a shaped elastic skin, said skin having a memory and elongation characteristics permitting stretching of at least 300 percent of its original dimensions and yet returning to such dimensions upon release of the stretching tension, and (2) a viscous liquid filling material sealed inside the shaped elastic skin, said filling material having a viscosity in the range of 5×10^3 centipoises to 5×10^8 centipoises at 70° F. which viscosity remains constant under shear, cohesive properties such that the same will flow and not separate when the shaped elastic skin is stretched, adhesive characteristics such that the same adheres to the shaped elastic skin when the skin is stretched and a chemical composition such that it will not destroy the shaped elastic skin.

4,169,337
PROCESS FOR POLISHING SEMI-CONDUCTOR MATERIALS

Charles C. Payne, Chicago, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

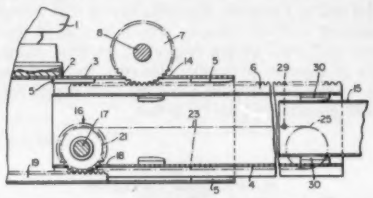
Filed Mar. 30, 1978, Ser. No. 891,665
Int. Cl.[2] B24B *1/00*
U.S. Cl. 51—283 R 5 Claims

1. An improved method for polishing silicon wafers and like materials which comprises polishing them with a polishing agent which comprises an aqueous colloidal silica sol or a gel which is combined with 0.1%–5% by weight of a water-soluble amine based on the SiO_2 content of the sol.

4,169,338
TELESCOPIC BOOM

Geir Eik, Ski, Norway, assignor to A/S NorMar, Oslo, Norway

Filed Aug. 29, 1977, Ser. No. 828,663
Claims priority, application Norway, Sep. 3, 1976, 763044
Int. Cl.[2] E04H *12/34*; B66C *23/06*
U.S. Cl. 52—118 4 Claims



1. A telescopic structure comprising a plurality of elongated slidably fitted concentric tubular sections including:

(a) a first tubular housing section having at the outer surface of its one end a drive mechanism comprising a first gear wheel mounted for rotation about a fixed axis on said housing section and protruding through a slot formed therein, said first housing further having a first gear rack extending longitudinally along its internal surface;

(b) a second tubular section having an outside dimension smaller than the first housing section and having a second gear rack formed on its external surface for engagement with the first gear wheel mounted on and protruding through the housing section, whereby on rotation of said first gear wheel said second section is moved longitudinally relative to said tubular housing section;

said second section further comprising longitudinally spaced first sprocket wheels mounted for rotation adjacent opposite ends of said second section, an endless first chain extending about said sprocket wheels for moving thereby, a first pair of said first sprocket wheels being mounted for rotation on a transversely extending shaft carrying a second gear wheel which protrudes through an opening in said second section for engagement with the first gear rack on the internal surface of said housing section;

whereby on longitudinal movement of said second section caused by the rotation of said first gear wheel of said

housing section, said second gear wheel will rotate to impart a movement to the endless first chain;

(c) a third section having an outside dimension smaller than the second section and means for engaging the endless first chain of the second section so as to be moved longitudinally relative to said second section upon movement of said first chain when said second section is caused to move by the rotation of said first gear wheel on the housing section.

4,169,339

PLATE FOR GRATING AND GRATING RESULTING THEREFROM

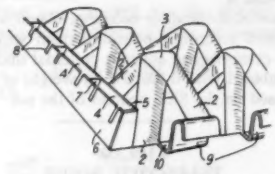
Jacques L. A. See, Neuilly-sur-Seine, France, assignor to Substratum S.A., Luxembourg

Filed Jan. 31, 1978, Ser. No. 873,948

Claims priority, application France, Jan. 31, 1977, 77 02641; Apr. 29, 1977, 77 12992

Int. Cl.² B32B *3/00*; E04C *2/42*

U.S. Cl. 52—177 **16 Claims**



1. A grating comprising a plurality of plates made of an assembly of molded pyramidal elements arranged according to orthogonal lines and rows, each of said pyramidal elements being formed by thin arms, said arms having tops connected by an elongated and substantially wax-drop shaped reinforcing part and said arms having respective bottoms connected to bottoms of adjacent pyramidal elements, and each said plate further having lateral walls provided with means for assembling said plurality of plates together.

4,169,340

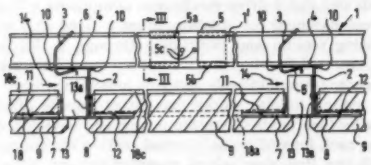
SUSPENDED CEILING

Timothy J. Watson, Peckham Bush, England, assignor to Matra-Tech Thermal & Acoustic Services Limited, Kent, England

Filed Feb. 17, 1978, Ser. No. 878,873

Int. Cl.² E04B *5/52*

U.S. Cl. 52—774 **23 Claims**



1. A suspended ceiling comprising mutually parallel elongate support members, and ceiling panels supported by the support members, each support member having on one side a flange extending into a slot in each ceiling panel adjacent that side and spring means for resisting motion of each said ceiling panel towards the support member and having on the other side a flange extending into a slot in each ceiling panel adjacent that side, each ceiling panel being supported by two said support members and being movable against the action of the spring means towards one of the said two support members in order to release that panel from the other support member.

4,169,341

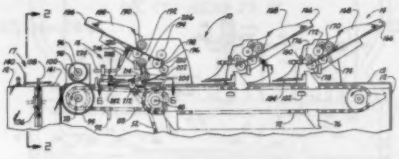
DOCUMENT COLLATING AND ENVELOPE STUFFING APPARATUS

Francis T. Roetter, Westport; Frank A. Oeschger, East Norwalk, and Charles B. Pearson, Cos Cob, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jan. 19, 1978, Ser. No. 870,741

Int. Cl.² B65B *35/50*

U.S. Cl. 53—154 **19 Claims**



12. A document collating and envelope stuffing apparatus wherein documents are collated in seriatim along a longitudinally extending feed path having an upstream end and a downstream end and then collectively stuffed into an envelope, comprising:

a plurality of platforms arranged in series along the feed path;

means for feeding documents to said platforms;

a stuffing station located on the feed path downstream from said platforms, said stuffing station having means for releasably detaining an envelope at a location on the feed path and means for opening the throat of an envelope that is being retained by said detaining means;

means for feeding documents to said stuffing station;

a continuous conveying means extending along the feed path, said conveying means having two sets of longitudinally spaced pushers, a pusher of one of said sets being laterally aligned with a pusher of the other set, said platforms and said stuffing station being located intermediate said two sets of pushers;

means for driving said continuous conveying means; whereby,

said pushers are conveyed from the upstream end to the downstream end of the feed path past said platforms and said stuffing station by said conveying means to collect documents on said platforms and collate the same to insert the collated documents into an envelope located at said detaining means, and to release said detaining means.

4,169,342

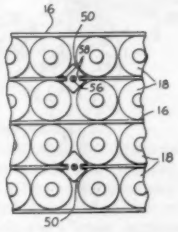
ARTICLE SEPARATING DEVICE FOR CASE LOADING MACHINE

Thomas P. Hartness, 305 Bridgewater Dr., and Robert G. Hartness, 203 Wilmington Rd., both of Greenville, S.C. 29601

Filed Nov. 14, 1977, Ser. No. 851,603

Int. Cl.² B65B *39/02, 21/06*

U.S. Cl. 53—248 **3 Claims**



3. An apparatus for controlling the flow of articles of a cylindrical cross section being fed to a case packer in rows on a transporting surface of a conveyor, said case packer having

an article supporting member which is shifted for depositing a predetermined number of articles into a case, said apparatus comprising:

a plurality of vertically extending divider plates carried between said rows of articles maintaining said articles in rows as said articles are fed onto said case packer,

vertically extending abutments carried above said divider plates and the path of travel of said articles as said articles are transported to said case packer,

said abutments having a square cross section and being carried to present a diamond configuration to said incoming articles so as to provide maximum surface contact between the sides of articles of adjacent rows, and

means for selectively lowering said vertically extending abutments into the path of travel of said articles for separating a predetermined number of said articles loaded on said case packer from said articles being fed to said case packer on said transporting surface.

4,169,343

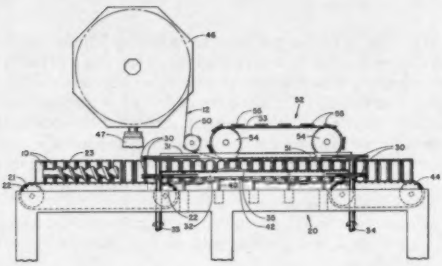
MULTIPACKAGING METHOD AND APPARATUS

Edward J. McArdle, Morton Grove, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 828,002, Aug. 28, 1977, abandoned. This application May 22, 1978, Ser. No. 908,593

Int. Cl.[2] B65B *27/04*

U.S. Cl. 53—398 **15 Claims**



1. The method of applying a continuous strip of elastic plastics material multipackaging devices over one end of a plurality of containers in which the strip comprises a plurality of end-to-end connected multipackaging devices each of which comprises two rows of band areas extending longitudinally thereof along the opposite outward sides thereof in ranks and in which each band area is circumferentially complete and of a peripheral dimension less than the outer circumferential dimension of each of the said plurality of containers adjacent said one end thereof, comprising the steps of:

arranging said plurality of containers in two rows and in ranks and moving said two rows in the direction of said rows and relatively inserting opposed outer sidewall portions of each successive rank of containers through said band areas of successive ones of said ranks of band areas and against the transversely outward band portions of said two rows of band areas of said strip of multipackaging devices with said strip of multipackaging devices in a transversely unstretched condition,

continuing the movement of said two rows of containers and concurrently moving at least said opposed outer sidewall portions of each rank of said two rows of containers successively apart to urge said opposed outer sidewall portions of each successive rank of said containers against said outward band portions of said two rows of band areas to tension said multipackaging devices of said strip in directions transversely thereof, and

continuing movement of said two rows of containers apart until the remainder of said two rows of band areas extending from said outward band portions slide over and about the remaining sidewall portions extending from said opposed outer sidewall portions of each rank of said containers.

4,169,344

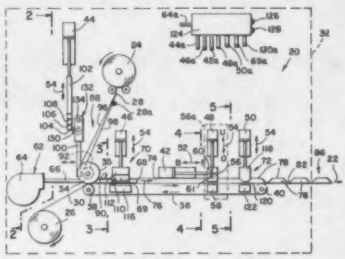
APPARATUS FOR FABRICATING CUSHIONING AND INSULATING MATERIAL

James B. Ganz, Plainview; Stephen Koval, Forest Hills, both of N.Y., and Raymond P. Meenen, Hawthorne, N.J., assignors to Sagan Industries, Inc., Long Island City, N.Y.

Filed Jan. 30, 1978, Ser. No. 873,486

Int. Cl.[2] B65B *9/04*

U.S. Cl. 53—546 **22 Claims**



1. An apparatus for making fluid filled cells in material comprising a main frame comprising: a fabricating line pathway; means to move material for processing along the fabricating line pathway; a tube forming station, a longitudinal fastening station, and a transverse fastening station along said fabricating line pathway; fluid blowing means associated with at least one fluid duct positioned along said fabricating pathway, said fluid duct having an outlet positioned between said tube forming station and said transverse fastening station; a tube forming roller in the tube forming station comprising at least one groove; and at least one movable finger positioned to move from a first position outside of said roller groove to a second position within said roller groove to place a portion of the material within the roller groove.

4,169,345

DEVICE FOR OPENING OUT THE FILLING APERTURES OF BAGS

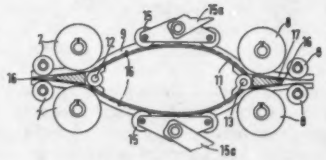
Rudolf Douwenga, Emmen, Netherlands, assignor to Lockwood International B.V., Nieuw-Amsterdam, Netherlands

Filed Sep. 27, 1977, Ser. No. 837,283

Claims priority, application Netherlands, Dec. 22, 1976, 7614290

Int. Cl.[2] B65B *43/34*

U.S. Cl. 53—570 **8 Claims**



1. A device for opening out the filling apertures of bags which are connected together in a strip, the device comprising:

two conveyor belts which run parallel and adjacent to each other so that the edges of the bag apertures can be fed between them;

two blades arranged between the two conveyor belts so that each edge of a bag aperture can be received between a

repective blade and belt, each of the blades comprising at least two substantially rigid blade members which are pivotally connected together;

two hinged joints joining the blades together at their ends; and

means mounting the joints for allowing at least one of the joints to approach the other to cause the blades to expand outwards to spread apart the two conveyor belts and therefore also the edges of a bag aperture received between the respective blades and belts.

4,169,346

BINDING DEVICE FOR BINDING OPENINGS OF BAGS OR THE LIKE

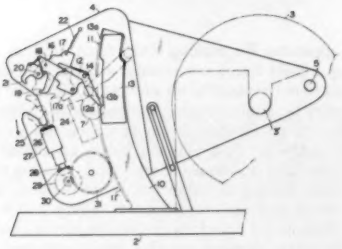
Fumiko Tange, Nagoya, Japan, assignor to Kaoru Ogasawara, Kyoto, Japan, a part interest

Filed Apr. 14, 1978, Ser. No. 896,677

Claims priority, application Japan, Feb. 14, 1978, 53-15727

Int. Cl.[2] B65B *57/08*

U.S. Cl. 53—583 **5 Claims**



1. A binding device for binding the openings of bags or the like which comprises a stationary vertical support plate which carries thereon a reel for a binding material such as iron wire, wire-carrying cord or stiff cord; a pair of rocking plates which are pivotally secured at their end portions to said support plate; a cord delivery mechansim which comprises a pair of supporting rollers mounted on said rocking plates that are rotated by an upper rack formed on the front side of a stationary arcuate guide plate which is disposed in front of said vertical support plate; a cord winding mechanism mounted on said rocking plates which is disposed above said cord delivery mechanism and comprises a pivotable actuating plate and a pair of L-shaped winding arms mounted on said plate, an actuating rod mounted on said plate and operated by a cam shoulder formed on the side face of said arcuate guide plate to pivot said plate and arms; a cord cutting mechanism which is disposed in front of said cord delivery mechanism and is operated by the pivoting of said actuating plate; and a cord twisting mechanism mounted on said rocking plate which is disposed below U-shaped recesses for receiving said bag opening, which recesses are formed in the front portions of said rocking plates, said twisting mechanism being provided with an engaging pawl which is rotated by a rack formed on the lower part of said arcuate guide plate; whereby when said rocking plates are pivoted down by pushing an article to be bound into said U-shaped recesses, a length of said binding material is delivered from said cord delivery mechanism, said binding material is then cut by said cord cutting mechanism to form a piece of cord, said piece of cord is applied to and bent around the article to be bound by means of said cord winding mechanism, and both the end portions of said cord piece are caught and twisted together by said cord twisting mechanism.

4,169,347

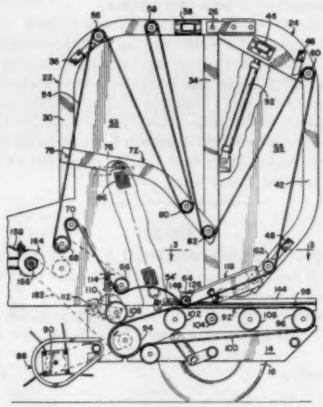
BELT-TYPE BALER FOR CYLINDRICAL BALES

Carmen S. Phillips, Memphis, Tenn., assignor to International Harvester Company, Chicago, Ill.

Continuation of Ser. No. 507,302, Sep. 19, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,342

Int. Cl.[2] A01D *39/00*

U.S. Cl. 56—341 **19 Claims**



1. In a baler for fibrous material including a frame supporting a lower endless belt having an upper run and a plurality of upper endless belts superposed over the upper run to define an expansible bale-forming zone therebetween, a gate swingably mounted on the frame for generally rearward movement as a bale is formed in said zone, a roller in engagement with the upper belts in proximity to said upper run and defining therewith a movable parameter of said bale-forming zone, wherein the improvement comprises:

means supporting said roller on said gate for rearward movement on a straight-line path as said gate swings rearwardly; and

guide means on said frame for guiding said roller in said straight-line path closely parallel to said upper run, whereby material on said upper run is prevented from being conveyed thereby out of said bale-forming zone during bale formation.

4,169,348

FIBRE OPENING APPARATUS FOR AN OPEN-END SPINNING MACHINE

Reginald M. Blackburn, deceased, late of Accrington, England (by Althea Blackburn, personal representative), assignor to Platt Saco Lowell Limited, Great Britain

Filed Jun. 22, 1978, Ser. No. 918,194

Claims priority, application United Kingdom, Jun. 22, 1977, 26018/77

Int. Cl.[2] D01H *1/12*

U.S. Cl. 57—58.91 **11 Claims**

1. Apparatus for opening fibres in an open-end spinning machine, comprising:

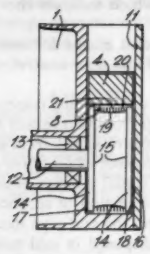
a housing,

a recess formed in the housing so as to define a fibre locating surface,

an opening roller mounted for rotation in the recess whereby to open fibres from a sliver fed thereto,

the opening roller having a peripheral surface cooperating with the fibre locating surface to define therewith a fibre conveying passage, a plurality of teeth protruding from the peripheral surface of the opening roller into the fibre conveying passage such that each of the tips thereof terminates in an imaginary cylindrical surface and equi-distant from the fibre locating surface,

wherein the generatrix of the peripheral surface is concave so that the radial distance between the generatrix and the



imaginary cylindrical surface is a maximum at a position intermediate the length of the generatrix.

4,169,349

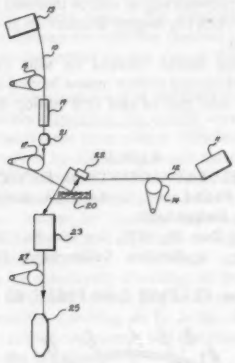
PRODUCTION OF SIMULATED SPUN-LIKE BULKED YARN

James R. Talbot, Charlotte, N.C., assignor to Fiber Industries, Inc., Charlotte, N.C.

Division of Ser. No. 674,350, Apr. 7, 1976, Pat. No. 4,060,970. This application Aug. 29, 1977, Ser. No. 828,455

Int. Cl.[2] D02G *1/20*

U.S. Cl. 57—289 **16 Claims**



1. A process for producing continuous filament spun-like yarn comprising false twist texturing a synthetic continuous filament yarn to produce a torque lively yarn, overfeeding said textured torque yarn to a high velocity gaseous jet to convolute individual filaments in the yarn to form a plurality of torque induced kinks, heat treating said convoluted and kink-containing yarn to set said yarn to further reduce said torque, and taking up the textured yarn on a package.

4,169,350

PNEUMATIC SPINNING APPARATUS

Makoto Yamana, Joyoshi, and Nobunori Kubota, Nagaokakyo-shi, both of Japan, assignors to Murata Kikai Kabushiki Kaisha, Japan

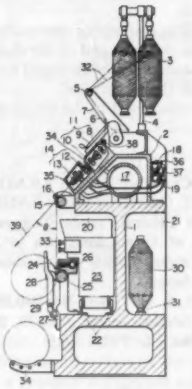
Filed Sep. 29, 1977, Ser. No. 837,831

Claims priority, application Japan, Oct. 4, 1976, 51-134076[U]; Jun. 4, 1977, 52-72856[U]

Int. Cl.[2] D01H *7/90, 1/16*

U.S. Cl. 57—350 **4 Claims**

1. Pneumatic spinning apparatus comprising a lower machine frame adapted to rest on a floor and having an operator's side, an upper machine frame supported on the lower machine frame at a height above the floor between the waist and shoulders of a machine operator, means for supporting sliver bobbins from the upper machine frame, sliver guides supported by the upper machine frame, a package support positioned on the operator's side of the lower machine frame, a drive roller and traverse guide carried by the lower machine frame and operably associated with a package supported by the package support to wind spun yarn on the package, take-out and nip rollers located substantially vertically above the drive roller and traverse guide for feeding spun yarn vertically to the package, a sliver guide pipe positioned immediately below the sliver guides for receiving sliver from the sliver bobbins through the guides substantially vertically and a drafting device including back rollers, an apron and front rollers, spinning means including a first nozzle and a second nozzle positioned in a spinning zone in alignment with each other and with the take-out roller for passing the sliver therethrough and the spun yarn therefrom in a straight line which is inclined to the vertical between 30° and 60° to provide ready inspection from the operator's side of the machine frame, whereby inspection, spinning and piecing up without tangling is facilitated, a suction duct extending through the upper machine frame, a first housing carried by the upper machine frame for encompassing the drafting device and including therein the sliver guide pipe for guiding sliver into the first housing encompassing the drafting device and a second housing for defining the spinning zone and encompassing the first and second nozzles, and a separate conduit passing between the suction duct and each of the housings for withdrawing air and loose particles from the area of the drafting device and the spinning zone, wherein the lower machine frame has a generally I-shape cross section one side of which defines a space on the operator's side of the machine frame in which tracks are positioned and further including a piecing device placed on the tracks for movement longitudinally of the lower machine frame within the space provided therefor between the lower machine frame and spun yarn extending between the take-out roller and drive roller, and wherein the lower machine frame provides a space on the side opposite the operator's side of the lower machine frame for storage of sliver bobbins.



4,169,351
ELECTROTHERMAL THRUSTER

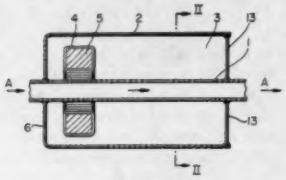
Brian C. Barber, Aldershot, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Oct. 25, 1977, Ser. No. 845,093

Claims priority, application United Kingdom, Oct. 25, 1976, 44306/76

Int. Cl.² F02K *9/00*

U.S. Cl. 60—203 **6 Claims**



1. An electrothermal thruster comprising an electric heater having a transformer with a secondary winding constituted by a duct for conveying and heating a fluid, and an electrically conductive element electrically connected to the inlet and outlet ends of the duct;

a chamber connected to a supply of thermally decomposable liquid propellant and to the inlet end of the duct and provided with an electrical resistance heater arranged to heat the chamber so as to decompose the liquid; and,

a propelling nozzle connected to the outlet end of the duct.

4,169,352
EXHAUST GAS CLEANING APPARATUS OF AN INTERNAL COMBUSTION ENGINE

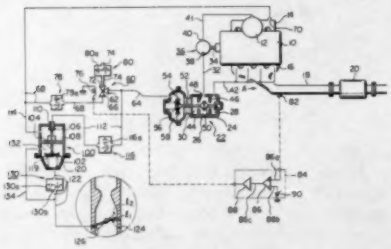
Minoru Iwata, Susono; Takeru Yasuda, Nagoya, and Hidenori Hirosawa, Obu, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Aisaon Industry Co., Ltd., Obu, both of, Japan

Filed Oct. 6, 1977, Ser. No. 840,097

Claims priority, application Japan, Jun. 29, 1977, 52-076567

Int. Cl.² F01N *3/10*

U.S. Cl. 60—276 **5 Claims**



1. An exhaust gas cleaning apparatus of an internal combustion engine, having an intake system, an engine body and an exhaust system, said apparatus comprising:

a catalytic converter disposed in said exhaust system, which converter effectively operates to clean the exhaust gas when the air-fuel ratio of an exhaust gas directed to the catalytic converter is maintained near a predetermined value;

pipe means connected to the exhaust system at a position located upstream of the catalytic converter for introducing secondary air into the exhaust system;

flow control valve means located on said pipe means having a pressure signal chamber for controlling the amount of secondary air directed to the exhaust system in response to the pressure level in said chamber;

sensor means arranged in said exhaust system for providing electric signals which indicate the air-fuel ratio of the exhaust gas;

pressure signal conduit means for connecting the pressure signal chamber of said flow-control valve with a pressure signal source;

pressure switching valve means responsive to said electric signals transmitted from said sensor means for selectively introducing a pressure signal from said source into said pressure signal chamber of said flow control valve means via said pressure signal conduit means in order to selectively increase the amount of secondary air directed into said exhaust system via said pipe means;

first orifice means disposed in said pressure signal conduit means at a position located upstream of said pressure switching valve means for controlling the rate of increase in the amount of secondary air; and

pressure control means for maintaining, when the engine is operating under an acceleration condition, a rate of increase in the amount of secondary air high enough to effectively control the air-fuel ratio near to said predetermined value during the engine acceleration condition, said pressure control means comprising:

by-pass pressure signal conduit means adapted to communicate said pressure signal source with said pressure signal chamber of said flow control valve means;

pressure control mechanism for allowing the transmission of a pressure signal, via said by-pass conduit means, from said pressure signal source into said pressure signal chamber when the engine is under an acceleration condition; and

second orifice means located on said by-pass conduit means, said second orifice means having an inner diameter larger than that of said first orifice means.

4,169,353
PNEUMATIC CONTROL DEVICE

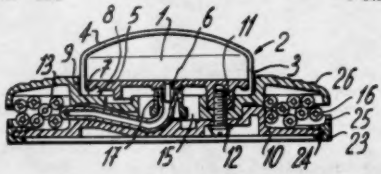
Marcel Fresard, Petit-Lancy, Switzerland, assignor to Mefina S.A., Fribourg, Switzerland

Filed Dec. 21, 1977, Ser. No. 862,980

Claims priority, application Switzerland, Dec. 30, 1976, 16463/76

Int. Cl.² F15B *7/08;* **F16J** *3/02*

U.S. Cl. 60—592 **6 Claims**



1. A pneumatic control device for a movable member of an electric circuit including a compressible air reservoir, a flexible conduit connecting said reservoir to an enclosure comprising the said movable member, said device comprising three superposed members which are at least partially housed one inside the other, fastener means connecting said members to one another and at least one member having a compressible wall and having an edge which is engaged and clamped between two of said superposed members; the first of said members together with said compressible walled member delimiting the air reservoir and being provided with an outlet nozzle discharging into an inner chamber which is delimited by the assembly of said three superposed members; the second and third of said superposed members delimiting a passage between them which connects said inner chamber to an annular outer storage chamber delimited by said second and third super-

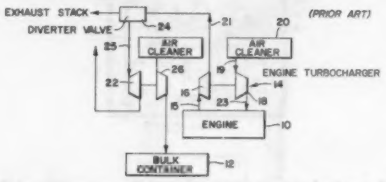
posed members, said outer chamber being open at its periphery; said second and third superposed members each having a peripheral edge, said flexible conduit being connected to said nozzle in said inner chamber and guided by said passage towards said outer storage chamber within which it is wrapped prior to withdrawl therefrom.

4,169,354

EXHAUST GAS AND TURBINE COMPRESSOR SYSTEM

William E. Woollenweber, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Dec. 27, 1976, Ser. No. 754,716
Int. Cl.[2] F02B *37/08*
U.S. Cl. 60—600 **6 Claims**



1. A system for selectively supplying compressed air to the intake of an internal combustion engine and to a pneumatic conveying system, said system comprising:

a rotatable turbine and a turbine housing having inlet means receiving exhaust gases from said internal combustion engine, and nozzle means for directing exhaust gases across said turbine for rotation thereof,

a compressor connected to and driven by said turbine for pressurizing air,

means operatively connected in the inlet duct of the turbine for selectively changing the nozzle area between a first relatively large area from which sufficient compressed air can be supplied by the compressor means to operate the engine at full load and a second relatively small area from which sufficient compressed air can be supplied by the compressor means to operate a pneumatic conveying system while the engine operates at high RPM under a no-load condition, and

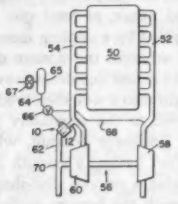
valve means for selectively directing air from the compressor to the air intake of said engine in one position and in another position directing air from the compressor to the pneumatic conveying system and simultaneously naturally aspirating the engine.

4,169,355

TURBOCHARGER WASTEGATE VALVE

Brian E. Walsham, Holmfirth; William K. Bruffell, Mirfield, and Howard S. Atkin, Leeds, all of England, assignors to Holset Engineering Company Limited, Turnbridge, England

Filed Dec. 5, 1977, Ser. No. 857,544
Claims priority, application United Kingdom, Dec. 3, 1976, 50429/76
Int. Cl.[2] F02B *33/44*; F02D *23/00*
U.S. Cl. 60—682 **9 Claims**



1. In combination:

a turbine rotatable in response to a hot gas stream;

means for directing a hot gas stream to and across said turbine;

means for selectively bypassing said hot gas stream around said turbine; said bypassing means comprising:

means defining a cylindrical chamber having a radially directed inlet from a point upstream of said turbine and an outlet connected to a point down stream of said turbine,

means for selectively directing at least one gas stream at high velocity across said radially directed inlet generally at a right angle relative to the gas issuing from said inlet and tangetial to said chamber for selectively preventing flow into said chamber,

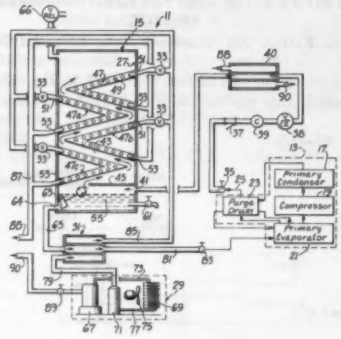
whereby hot gases are bypassed around said turbine in the absence of said high velocity stream and substantially directed across said turbine when said high velocity stream exists.

4,169,356

REFRIGERATION PURGE SYSTEM

Lloyd Kingham, 12161 Ferrari La., Garden Grove, Calif. 92641

Filed Feb. 27, 1978, Ser. No. 881,189
Int. Cl.[2] F25B *47/00, 7/00, 43/04*
U.S. Cl. 62—85 **16 Claims**



1. A refrigeration apparatus comprising:

a primary refrigeration system of the type which is adapted to employ a primary refrigerant and in which purge gas accumulates which must be purged from the primary refrigeration system, said purge gas including a primary refrigerant component and a noncondensable component;

a purge drum;

first means for conducting the purge gas from the primary refrigeration system into the purge drum;

a secondary refrigeration system;

said secondary refrigeration system being adapted to employ a secondary refrigerant;

second means for conducting the secondary refrigerant from the secondary refrigeration system to the purge drum;

said purge drum including means for passing the purge gas and the secondary refrigerant in heat exchange relationship to condense at least a substantial portion of the primary refrigerant component of the purge gas;

means for returning the condensed portion of the primary refrigerant from the purge drum to the primary refrigeration system; and

means for expelling the noncondensable component of the gases from the purge drum.

8. A method of purging a primary refrigeration system which uses a primary refrigerant wherein purge gas including a primary refrigerant component and a noncondensable component accumulate in the primary refrigeration system, said method comprising:

providing a secondary refrigeration system and a secondary refrigerant for the secondary refrigeration system;

cooling the secondary refrigerant using the secondary refrigeration system to a temperature colder than any temperature attained by the primary refrigerant in the primary refrigeration system to thereby provide cold secondary refrigerant;

passing the cold secondary refrigerant and the purge gas in heat exchange relationship to condense at least a substantial portion of the primary refrigerant component of the purge gas; and

reusing the condensed portion of the primary refrigerant in the primary refrigeration system.

4,169,357

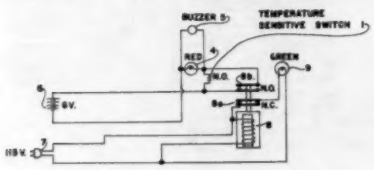
REFRIGERATOR AND FREEZER MONITORING DEVICE

Joseph B. Kelley, 211 Sycamore Ave., Moundsville, W. Va. 26041

Continuation-in-part of Ser. No. 759,108, Jan. 13, 1977, abandoned. This application May 1, 1978, Ser. No. 901,514

Int. Cl.[2] F25B *49/00*

U.S. Cl. 62—126 **1 Claim**



1. A refrigerator and freezer monitoring device for indicating when electrical energy is supplied thereto and for warning when the temperature rises above a predetermined level, said refrigerator and freezer being powered by a commercial power source via a wall-type outlet, said refrigerator and freezer monitoring device comprising

a temperature-sensitive switch in a refrigerator and freezer, separate from the refrigeration and freezer equipment said switch remaining open when the temperature is below a predetermined level and closing when the temperature rises above said predetermined level;

visible alarm means outside and separate from the refrigerator and freezer at the wall-type outlet;

audible alarm means outside and separate from the refrigerator and freezer at the wall-type outlet;

battery means electrically connected to the visible alarm means and the audible alarm means via the temperature-sensitive switch whereby when the temperature in the refrigerator and freezer rises above the predetermined level the visible and audible alarm means are actuated;

a power switch remaining closed when the commercial power source provides the required power and which opens when the commercial power source fails; and

a power indicating lamp at the wall-type outlet and electrically connected to the commercial power source via the power switch whereby said power lamp is energized as long as sufficient power is provided by the commercial power source.

4,169,358

DEFROSTING APPARATUS FOR A REFRIGERATOR

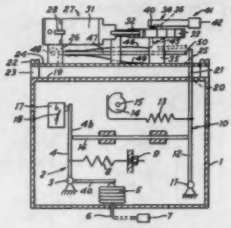
Børge M. Hansen, Sonderborg; Per Andersen, Nordborg; Uwe W. Hoppmann, Sonderborg, and Hans J. Bebe, Nordborg, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Dec. 2, 1977, Ser. No. 856,645

Claims priority, application Fed. Rep. of Germany, Dec. 7, 1976, 2655315

Int. Cl.[2] F25D *21/08*

U.S. Cl. 62—154 **8 Claims**



1. A control system for a refrigeration assembly of the type which includes a compressor, a compressor motor, and an evaporator, said system comprising a motor switch, fluid pressure operating means responsive to evaporator temperatures, defrosting actuating means having a defrost setting, driving means responsive to the periodic operation of said compressor to cyclically move said defrosting actuating means to its defrost setting after each predetermined number of compressor starts and stops, linkage means between said fluid pressure operating means and said motor switch, main spring means operating on said linkage and opposing said fluid pressure operating means, and differential spring means operatable on said linkage for assisting said fluid pressure means, said differential spring means being made inoperative by said defrosting actuating means during said defrost setting, said differential spring being calibrated so that when both said springs are operating on said linkage said motor switch is actuated at a predetermined evaporator temperature, and said main spring being calibrated to be effective during said defrost setting to actuate said motor switch at a fixed evaporator temperature higher than said predetermined temperature.

4,169,359

APPARATUS FOR THE PRODUCTION OF SOFT-ICE

Rienk Weerstra, Leeuwarden, Netherlands, assignor to Sweden Freezer Manufacturing Co., Seattle, Wash.

Filed Jun. 20, 1977, Ser. No. 808,124

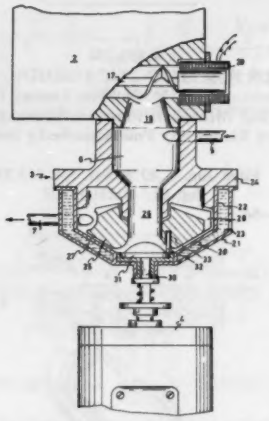
Claims priority, application Netherlands, Jul. 8, 1976, 7607558

Int. Cl.[2] A23G *9/04*; F25D *17/00*

U.S. Cl. 62—178 **13 Claims**

1. An apparatus for the production of soft-ice, provided with a reservoir for ice composition powder, a dosage device having a screw-conveyor for the powder, a supply pipe for water, a vertically oriented mixer, at least one level-sensor and a freezing cylinder chilled by a cooling means and containing a stirrer therein, and wherein the dosage device conveys the powder in accurately dosed quantities into the mixer wherein the powder is brought into a well dissolved condition in water and is then conveyed to the separately positioned freezing cylinder through a discharge conduit, wherein the mixer is provided with a bowl having a smooth imperforate bottom surface, a rotor having a smooth disc-shaped bottom surface fitted in the bowl with the bottom surface of the bowl and rotor being spaced closely from one another to form a blending

gap, said rotor being rotatable relative to the bowl and having an axial passage for supplying powder and water to said bottom surface, a tangential outlet for the mixture of water and powder being present at the circumference of the bowl.



4,169,360

REFRIGERANT COMPRESSORS FOR AUTOMOTIVE AIR CONDITIONING REFRIGERATING SYSTEMS

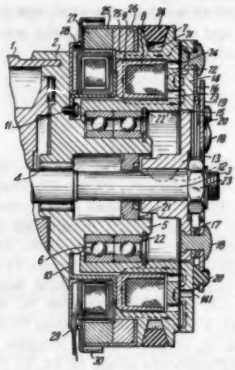
Hideaki Shimizu, Isesaki, Japan, assignor to Sankyo Electric Company Limited, Isesaki, Japan

Filed May 16, 1978, Ser. No. 906,403

Claims priority, application Japan, May 16, 1977, 52-55470; Sep. 6, 1977, 52-106280

Int. Cl.[2] F25B *27/00*; B60H *3/04*

U.S. Cl. 62—323 **8 Claims**



1. A refrigerant compressor having an electromagnetic clutch for use in an automotive air conditioning refrigerating system, said compressor comprising:

a compressor body including a compressor housing, a rotatable shaft protruding from said compressor housing for driving a compressor piston within said compressor housing, and a sleeve extending from said compressor housing surrounding and concentric with said shaft;

an electromagnetic clutch device comprising a rotating member rotatably mounted on said sleeve and adapted to be driven by an automobile engine, said rotating member being provided with magnetic attraction surface, a magnetic armature connected to said shaft and magnetically associated with said magnetic attraction surface, and electromagnetic means associated with said rotating element for attracting said armature to said magnetic attraction surface to transmit the rotating force of said rotating member to said shaft; and

an AC electric generator device comprising a rotor member mounted on said rotating member, and a stator member statically mounted on said compressor housing, one of said rotor member and said stator member being provided with magnetic pole pieces facing the other of said rotor member and said stator member with a gap arranged such that each two adjacent magnetic pole pieces are different in magnetic polarity from one another, and the other of said rotor member and said stator member including coil means in which electric currents are induced upon the rotation of said rotor member.

4,169,361

METHOD OF AND APPARATUS FOR THE GENERATION OF COLD

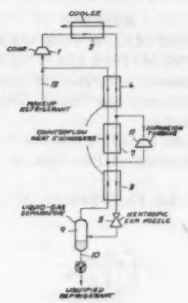
Wolfgang Baldus, Pullach, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Continuation of Ser. No. 736,081, Oct. 27, 1976, abandoned. This application Mar. 15, 1978, Ser. No. 886,801

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1975, 2548240

Int. Cl.[2] F25D *9/00*; F25B *43/00, 39/02, 41/06*

U.S. Cl. 62—402 **3 Claims**



1. An apparatus for the generation of cold on a very low temperature level, comprising:

a compressor for compressing a low-boiling gaseous coolant;

a cooler downstream of said compressor for abstracting compression heat from the compressed gaseous coolant;

a counterflow heat exchanger downstream and in addition to said cooler for exchanging heat between said compressed gaseous coolant and a cold gaseous low-pressure coolant;

an expansion nozzle downstream of said heat exchanger for expanding and partially liquefying the compressed gaseous coolant substantially isentropically to produce a cold partially liquefied fluid;

a cold consumer downstream of said expansion nozzle for transferring heat to said cold partially liquefied fluid;

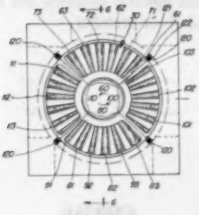
means for returning the part of said fluid leaving the cold consumer in the gaseous state to the counterflow heat exchanger as said cold gaseous low-pressure coolant; and

an expansion turbine connected ahead of said nozzle for work-expanding a portion of the compressed gaseous coolant, the balance of the compressed gaseous coolant being substantially isentropically expanded in said nozzle.

4,169,362
SOLID ADSORPTION AIR CONDITIONING APPARATUS

Sanford A. Weil, Chicago; William F. Rush, Arlington Heights; Jaroslav Wurm, N. Riverside, and Raymond J. Dufour, Wheaton, all of Ill., assignors to Institute of Gas Technology, Chicago, Ill.

Division of Ser. No. 780,693, Mar. 24, 1977, Pat. No. 4,121,432. This application Jul. 3, 1978, Ser. No. 921,780
Int. Cl.[2] F25B *17/02, 17/08*
U.S. Cl. 62—478 9 Claims

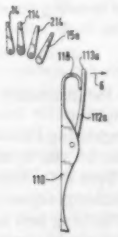


1. In an apparatus for air conditioning, a hermetically sealed module comprising a first and a second spaced, opposing, thermally conductive side, said first and second sides being separated by a thermally insulating material and said space enclosed in sealed relationship, a water vapor adsorbent on the interior of each of said first and second sides, and water vapor within said module in a quantity at least sufficient to fill the adsorptive sites of said adsorbent at one of said sides.

4,169,363
LATCH OPENING MEANS FOR WARP KNITTING MACHINE WITH LATCH NEEDLES

Karl Kohl, Obertshausen, Fed. Rep. of Germany, assignor to Karl Mayer Textilmaschinen Fabrik GmbH, Obertshausen, Fed. Rep. of Germany

Filed Feb. 14, 1978, Ser. No. 877,598
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1977, 2707028
Int. Cl.[2] D04B *23/00*
U.S. Cl. 66—207 7 Claims



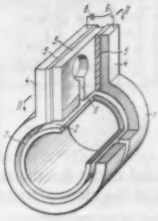
1. In a warp knitting machine having at least one guide bar with a plurality of thread guides affixed thereon, a plurality of latch needles, and drive means for moving said needles in an upwardly and downwardly direction and for moving said guide bar in a forwardly and rearwardly direction for the laying of threads when said latch needles are in their uppermost position and said guides are in their forwardmost position,

the improvement which comprises latch needle opening means affixed to said guide bars and moving therewith, said latch needle opening means being positioned on said guide bar to come into contact with and open an appropriate latch needle being in its upper position during the movement of said guides to their rearwardmost position.

4,169,364
APPARATUS FOR MAGNETIC FORMING OF METALS

Lev T. Khimenko; Yakov M. Batkilin; Anatoly V. Legeza, all of Kharkov, and Mikhail I. Puchkov, Kazan, all of U.S.S.R., assignors to Kharkovsky Politekhnichesky Institut, Kharkov, U.S.S.R.

Filed Jun. 7, 1978, Ser. No. 913,335
Int. Cl.[2] B21D *26/02*
U.S. Cl. 72—56 1 Claim



1. An apparatus for forming of metals under the pressure of pulsated magnet field, comprising:

at least two coils interconnected in series, the extreme coils being fitted with flat outputs arranged in parallel to one another along said coils;

a flat bus disposed intermediate said flat outputs and adapted to connect said coils;

a slot formed in said flat bus and facing said coils; said flat outputs being arranged so that said slots become overlapped therewith;

linings formed of an insulting material, spaced intermediate said flat bus and said flat outputs, and intended for their electrical insulation.

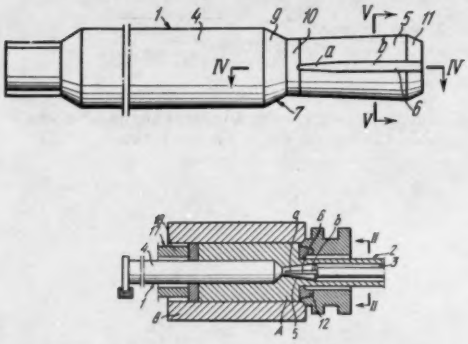
4,169,365
NEEDLE FOR PRESSING INTERNALLY-FINNED PIPES

Jury S. Starostin, ulitsa Pobedy, 69, kv. 47; Veniamin K. Erokhov, 13 Proezd, 19, kv. 14; Mikhail F. Golovinov, ulitsa Gvardeiskaya, 13, kv. 137; Antonina I. Berdjugina, prospekt Metallurgov, 90, kv. 30; Viktor I. Plokhov, ulitsa Stroitelei, 20, kv. 75; Lev. P. Kirillov, prospekt Metallurgov, 71-a, kv. 59, all of Kuibyshev; Anatoly A. Saprykin, ulitsa Sormovskaya, 10, korpus 1, kv. 38, Moscow; Vladimir N. Krotkov, ulitsa Chkalova, 24/32, kv. 132, Moscow; Anna N. Sergeeva, ulitsa Krivorozhskaya, 23, korpus 1, kv. 90, Moscow, and Evgeny D. Konovalenko, 4 Prodolnaya ulitsa, 29, kv. 10, Melitopol Zaporozhskoi oblasti, all of U.S.S.R.

Continuation of Ser. No. 756,704, Jan. 4, 1977, abandoned. This application Jan. 24, 1977, Ser. No. 761,987
Int. Cl.[2] B21C *25/04, 23/10*
U.S. Cl. 72—264 4 Claims

1. A needle having a longitudinal axis for pressing internally-finned pipes comprising a cylindrical portion; a pair of truncated cones having conjoint bases, said truncated cones and conjoint bases having surfaces nonparallel with the longitudinal axis of the needle, one of said pair forming a portion with longitudinal profiled channels intended to form the internal fins of said pipe; and intermediate portion joining said cylindrical portion and the portion with profiled channels and varying in diameter which first decreases then increases in the direction from said cylindrical portion to the portion with profiled chan-

nels; said portion with profiled channels having a smaller base directed towards said cylindrical portion and a larger base



conjoint with the larger base of the other of said pair of truncated cones.

4,169,366

DEVICE FOR EXTRUDING HOLLOW AND SEMI-HOLLOW SECTIONS

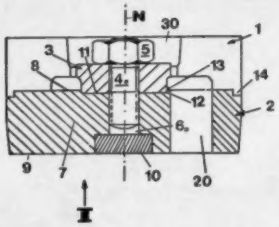
Adolf Ames, Hilizingen, Fed. Rep. of Germany, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Continuation of Ser. No. 617,070, Sep. 26, 1975, abandoned. This application Dec. 6, 1976, Ser. No. 747,551

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1974, 2446308

Int. Cl.[2] **B21C** *23/08, 25/04, 3/16*

U.S. Cl. 72—269 **12 Claims**



1. In an extrusion device for use in an extrusion tool including a die plate having two sides and defining a die passageway and opening for the extrusion of hollow sections of light metal, said device being of the type having at least one mandrel disposed on a mandrel support and projecting into the opening of the die, the improvement comprising:

said mandrel support having a surface disposed on one side of said die plate, said surface including a first part in line with said one side of said die plate and at least one second part recessed from said first part;

said at least one mandrel having a first side disposed in

said recess of said at least one second part and a second side projecting into said die passageway, said at least one mandrel being at least partly in line with said die opening;

at least one screw type connection means comprising a head portion and a stem portion operable for detachably engaging said mandrel in said recess of said at least one second part whereby the stresses at the junction of the mandrel and mandrel support exerted by the extruding metal are reduced and distributed; and

wherein said mandrel and said at least one second part of said mandrel support surface each have a hole defined therein and extending therethrough wherein said stem portion is received within said hole defined in said mandrel support and said head portion abuts the said second side of said at least one mandrel.

4,169,367

DEVICE FOR TESTING OF CONTACT ACTION BETWEEN ROTATING AND STATIONARY STRUCTURAL ELEMENTS OF FLOW RELATED ENGINES, ESPECIALLY GAS TURBINE POWER PLANTS

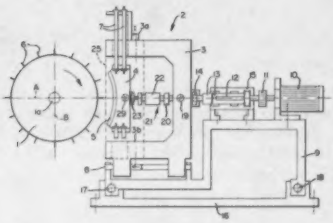
Max Wunder, and Albert Sickinger, both of Munich, Fed. Rep. of Germany, assignors to Motoren- und Turbinen-Union Munchen GmbH, Fed. Rep. of Germany

Filed Mar. 15, 1978, Ser. No. 886,760

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1977, 2711176

Int. Cl.[2] **G01N** *3/56;* **G01M** *13/00*

U.S. Cl. 73—7 **17 Claims**



1. A device for testing the contact-action effects between rotating and stationary structural elements of flow-related engines, such as turbine power plants, comprising a motor driven rotary means for supporting a rotational test element, a support frame means for mounting a stationary test element, positioning means for adjusting the position of said stationary test element mounted on said support frame means relative to the rotational test element supported by said rotary means in radial as well as axial directions, and measuring means for evidencing the effects of contact-action between the rotational and stationary test elements, wherein the support frame means is a U-shaped yoke having two free shanks opening toward the rotary means and is provided with a springly-suspended mounting block, said mounting block having a mounting surface facing said rotary means for mounting a specimen structural element to be tested.

4,169,368

ADJUSTABLE LUBRICATION QUALITY INDICATOR-PROTECTOR FOR ENGINES AND OTHER MACHINES

Harold M. Hendry, P.O. Box 13228, Tampa, Fla. 33611

Filed Jun. 6, 1978, Ser. No. 912,999

Int. Cl.[2] **G01N** *19/00, 33/30*

U.S. Cl. 73—10 **10 Claims**

1. A device for indicating the lubricating quality of lubricating oil for a machine; comprising in combination;

a frame rotatably mounting a shaft;

said rotatable shaft having a journal for rotation with said shaft;

a housing having an internal cavity;

means for rotatably mounting said housing on said rotatable shaft with said journal disposed within said internal cavity of said housing;

a journal engaging member mounted in said internal cavity for engaging said journal;

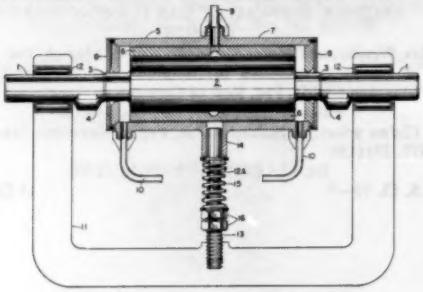
means for establishing a normal force between said journal engaging member and said journal;

an oil inlet and an oil outlet communicating with said internal cavity in said housing;

means connecting said oil inlet and said oil outlet to the machine for circulating the lubricating oil between said housing and the machine;

said oil inlet and said oil outlet directing the lubricating oil between said journal and said journal engaging member;

means for retarding the rotation of said housing relative to said frame; and



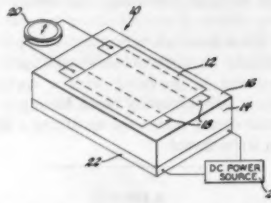
means for indicating the rotational position of said housing relative to said frame to determine the quality of the lubricating oil from the torque transferred from said rotating shaft to said housing by friction between said journal and said journal engaging means.

4,169,369

METHOD AND THIN FILM SEMICONDUCTOR SENSOR FOR DETECTING NO_x

Shih-Chia Chang, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 24, 1978, Ser. No. 927,488
Int. Cl.[2] G01N *27/04*
U.S. Cl. 73—23 **9 Claims**



1. A method for detecting the presence of NO_x species contained in a gaseous mixture comprising measuring the electrical resistance of a thin film semiconductor exposed to said mixture, said thin film semiconductor comprising polycrystalline tin oxide having an oxygen to tin atomic ratio between 1.5 and 1.95, said film having a known resistance to NO_x free gas environment, a substantial increase in film resistance over said known value indicating the presence of NO_x in the mixture.

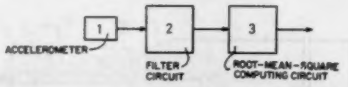
4,169,370

METHOD FOR EVALUATING SURGES OF MOTOR VEHICLES

Hirohide Iwase, Mishima; Yukio Maeda, Susono, and Tatsuo Sugitani, Mishima, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed May 1, 1978, Ser. No. 901,813
Claims priority, application Japan, May 18, 1977, 52/57337
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—116 **3 Claims**

1. Method for evaluating surges of motor vehicles comprising calculating the root mean squares of the amplitude produced within a given period of time in the surges within such frequency scope as allows the human sense to perceive them



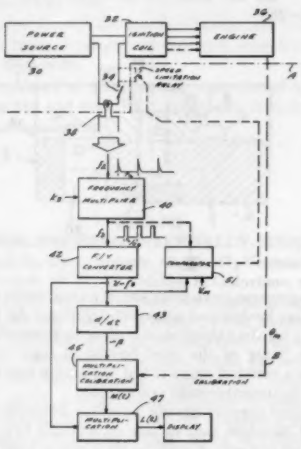
easily among the surges having a variety of frequencies which are produced during running of a motor vehicle.

4,169,371

METHOD AND APPARATUS FOR MEASURING DRIVE SYSTEM CHARACTERISTIC DATA IN DYNAMIC OPERATION

Ernst Witschi, Gloriastrasse 35, Zürich, Switzerland (CH-8006), and Walter Rüegg, Sandackerstrasse 537, Endingen, Switzerland (CH-5304)

Filed Aug. 8, 1977, Ser. No. 823,050
Int. Cl.[2] G01M *15/00*
U.S. Cl. 73—116 **32 Claims**

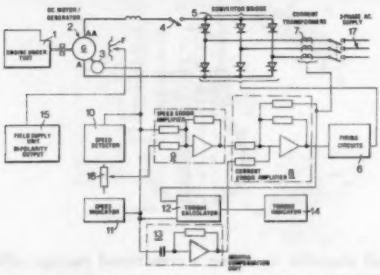


20. Apparatus for automatic determination of data denoting the torque, efficiency and/or power of an engine for a drive system in dynamic operation and in the original surrounding of the engine, the engine including a power supply and means for producing signals at a frequency proportional to the instantaneous rotational speed of the engine, comprising means for monitoring the speed of the engine while the latter is decoupled from the drive system, said monitoring means including sensor means for detecting said electrical signals and said monitoring means having an output for transmission of first signals denoting said speed; means for connecting said power supply with said monitoring means; and means for converting said first signals into second signals indicative of the torque, efficiency and/or power of the engine.

4,169,372
METHOD OF TESTING AND APPARATUS FOR TESTING ENGINES

John A. Colwill, and Richard J. Moulding, both of Loughborough, England, assignors to Brush Electrical Machines Limited, Leicestershire, England

Filed Apr. 19, 1978, Ser. No. 897,908
Claims priority, application United Kingdom, Apr. 20, 1977, 16338/77
Int. Cl.[2] G01L 3/02
U.S. Cl. 73—133 R 11 Claims



1. A method of testing an engine having a rotary power output shaft by mechanically-coupling the output shaft of the engine to the rotor of a rotary electrical machine, operable alternatively in motor and generator modes, by connecting conductors of the machine to conductors of an electrical supply main from which electrical power will be taken by the machine, when the machine is operating in the motor mode, and to which electrical power will be supplied by the machine, when the machine is operating in the generator mode, the electrical connections between the machine conductors and the supply main conductors being effected by power conversion means including power-carrying devices of a semi-conductor type, the power conversion means being operable to convert the main supply to a form acceptable by the machine when the machine is operating in the motor mode and to convert the output power from the machine to a form compatible with the main supply when the machine is operating in the generator mode, controlling the power conversion means to operate the machine to apply a controlled braking torque to the engine when the machine is operating in the generator mode, calculating and measuring the controlled torque and selecting the mode of operation of the machine.

4,169,373
TIRE BEAD INSPECTION

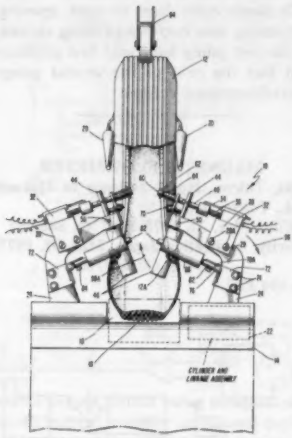
Samuel K. Clark, Ann Arbor, Mich., and Manuel J. Lourenco, Alexandria, Va., assignors to The United States of America as represented by the Department of Transportation, Washington, D.C.

Filed Sep. 27, 1978, Ser. No. 946,127
Int. Cl.[2] G01M 17/02
U.S. Cl. 73—146 13 Claims

1. An arrangement for measuring the stiffness of a tire bead comprising:

means for exerting a generally axial force against one side of the tire bead at a first point,

means at a pair of circumferentially adjacent points on both sides circumferentially of said first point for resisting said force on the other bead side of the tire bead, and

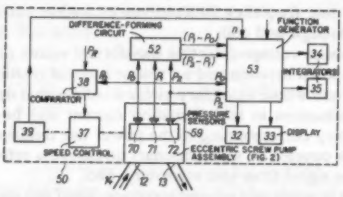


means for measuring the resultant axial displacement at said first point relative to the adjacent points to derive a measure of the bead stiffness.

4,169,374
APPARATUS FOR CONTINUOUSLY MEASURING THE FLOW RATE OF EACH OF THE COMPONENTS OF A COMPOSITE FLUID FLOW FORMED OF A LIQUID AND OF A GAS

Jean-Pierre Budliger, Onex, and Simon Arieh, Geneva, both of Switzerland, assignors to Battelle Development Corporation, Columbus, Ohio

Filed Mar. 17, 1978, Ser. No. 887,791
Int. Cl.[2] G01F 1/34
U.S. Cl. 73—194 E 8 Claims



1. Apparatus for continuously measuring the rate of flow of each of the components of a composite flow formed of a liquid and of a gas, comprising:

a volumetric device for dividing said composite flow into separate successive fractions of a first predetermined volume and for varying the volume of said successive fractions from said predetermined volume to a second predetermined volume;

means for measuring the change in pressure of said composite flow resulting from the volume change from the first predetermined volume to the second predetermined volume;

means for measuring the flow rate of said composite flow;

means for determining the proportions of each component in each of said fractions from a comparison of the volume variation and pressure change of said composite flow in successive fractions; and

means for determining the rate of flow of each of said components from the flow rate of said composite flow and from the proportions of each of said components in said

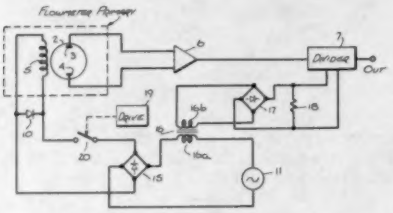
flow, said volumetric device consisting of an arrangement of at least two positive displacement pumps mounted end to end via a junction chamber, each of said pumps being arranged so as to comprise a plurality of separate successive cells displaceable from its inlet opening to its discharge opening, said two pumps being chosen so that the cells of the first pump have said first predetermined volume and that the cells of the second pump have said second predetermined volume.

4,169,375

MAGNETIC FLOWMETER

Kazuie Suzuki, Tokyo, Japan, assignor to Hokushin Electric Works, Ltd., Tokyo, Japan

Filed Mar. 21, 1978, Ser. No. 888,631
Claims priority, application Japan, Mar. 31, 1977, 52/36462
Int. Cl.[2] G01F *1/60*
U.S. Cl. 73—194 EM **5 Claims**



1. In combination with a magnetic flowmeter in which the fluid to be metered is conducted through a flow tube having detecting electrodes, the fluid intercepting the magnetic field produced by an electromagnet having an excitation coil to induce a flow rate signal in said electrodes, said flow rate signal being subject to unwanted fluctuations as a result of fluctuations in the current exciting said coil, said system comprising:

A. rectification means coupled to a commercial power line source whose a-c power has a relatively high-frequency to produce a direct-current voltage, and means including a periodically-actuated switch to apply said voltage across said coil at a rate whose frequency is low relative to the power line frequency to cause an excitation current to flow through said coil;

B. a reference voltage-detecting transformer whose primary is interposed between said a-c source and said rectification means and whose secondary yields a voltage that depends on fluctuations in said excitation current and having a frequency corresponding to the power line frequency;

C. means coupled to said secondary to derive a reference-voltage signal from said secondary; and

D. means to apply said reference voltage signal and said flow rate signal to a converter to produce an output flow rate signal free of said fluctuations.

4,169,376

EXTERNAL SENSING SYSTEM FOR VORTEX-TYPE FLOWMETERS

Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Company, Warminster, Pa.

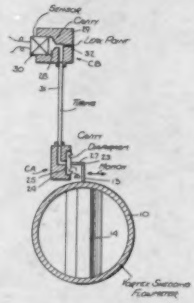
Filed Jun. 26, 1978, Ser. No. 919,247
Int. Cl.[2] G01F *1/32*
U.S. Cl. 73—194 VS **4 Claims**

1. An external sensing system for a vortex-type flowmeter in which the fluid to be metered is conducted through a flow tube having an obstacle assembly therein producing periodic vortices which cause a deflectable element to vibrate at the same rate, these vibrations being transmitted to an external sensing point, said system comprising:

A. a pneumatic cell whose body has a chamber therein covered by a diaphragm which is linked to said sensing point and is vibrated to generate a compressional wave corresponding to said periodic vortices;

B. a pick-up cell whose body has a cavity therein which is covered by a pressure-sensitive transducer; and

C. a pipe coupling said chamber to said cavity, whereby said compressional wave is conveyed to said transducer to generate an output signal, said pipe having a relatively



small diameter to define a constricted passage offering significant resistance to said compressional wave to a degree causing said transducer to provide an output signal whose frequency is a function of the flow rate and whose amplitude is inversely proportional to said frequency and is therefore proportional to the mass of the fluid flowing through said tube.

4,169,377

QUANTITY SENSING SYSTEM FOR A CONTAINER

William F. Scheib, Hillside, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

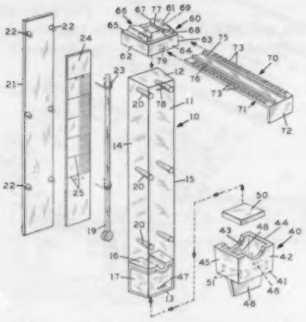
Filed Apr. 17, 1978, Ser. No. 896,929
Int. Cl.[2] G01F *23/24*
U.S. Cl. 73—304 R **12 Claims**

1. A level sensor adapted to be connected to a monitor for measuring the quantity of an electrically conductive fluent material in a container, said sensor comprising an elongated pipe of uniform cross section throughout its length adapted to stand vertically within the container for sensing the quantity of material therein, said pipe being of electrically non-conducting material having chemically inert and low surface tension characteristics, a plurality of pairs of electrodes carried by said pipe at the outer surface thereof in vertically spaced apart relation, the electrodes of each pair being of the same vertical level, a pair of resistance members within said pipe, one electrode of each pair connected to one of said resistance members at equal vertically spaced apart points therealong, and the other electrode of each pair connected to the other of said resistance members at equal vertically spaced apart points therealong.

4,169,378
AQUARIUM THERMOMETER

Silvio J. DiMarchi, Wychoff, N.J.; Marvin A. Goldman, Great Neck, N.Y.; Arthur Gilmore, Greenlawn, N.Y., and Jerome N. Goldman, New York, N.Y., assignors to Penn-Plax Plastics, Inc., Garden City, N.Y.

Filed Jun. 19, 1978, Ser. No. 916,524
Int. Cl.[2] G01K *1/14*
U.S. Cl. 73—353 10 Claims



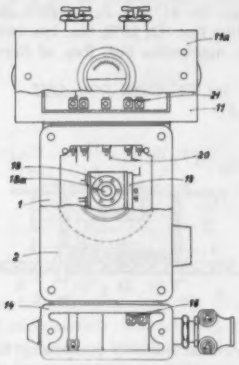
1. A modular aquarium thermometer assembly comprising:
(a) a one-piece elongated, transparent, non-toxic housing having a front wall, side walls, and top and bottom walls;
(b) integral first support pin means extending rearwardly along each of said side walls;
(c) a one-piece rear wall having integral second support pin means extending forwardly along the side edges of said rear wall;
(d) said first and second pins being in substantial registry;
(e) an internal wall extending across said housing and cooperating with said bottom wall and lower portions of said side walls to define a ballast chamber;
(f) first ballast means disposed in said ballast chamber and being of predetermined weight sufficient to submerge the lower end of the assembly in a body of water but of insufficient weight to sink said assembly in a body of water;
(g) a planar scale member;
(h) an elongated glass thermometer means secured to said scale member;
(i) said scale member suspended in said assembly in a sandwiched relation between the opposite faces of said first and second pin means;
(j) said housing being closed off in watertight manner by said rear wall.

4,169,379
TEMPERATURE MEASURING DEVICE FOR NON-CONTACTING TEMPERATURE MEASUREMENT

Hans C. Kugler, Bruchwiesen-Anlage 1, Saarbrucken-Dudweiler, Fed. Rep. of Germany (6602)

Filed Feb. 15, 1978, Ser. No. 877,823
Int. Cl.[2] G01J *5/04*
U.S. Cl. 73—355 R 4 Claims

1. A temperature measuring device for use in locations endangered by explosion or firedamp, comprising:
a radiation pyrometer for non-contacting temperature measurement, said pyrometer including an electric output circuit having outlet terminals;
a pressure-resistant main housing for enclosing said pyrometer;
an insert removably mounted in the front wall of said main housing and located optically in front of said pyrometer, said insert comprising a radiation inlet and a window in the form of a germanium disc mounted in said inlet;
sealing and clamping means for pressure-resistant mounting of said disc in said insert and of said insert in said front wall; and
pressure-resistant openings in said housing for receiving inlet power cables and said pyrometer circuit outlet terminals;

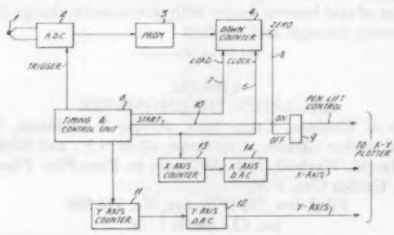


said pyrometer output circuit being designed such that the short-circuit current intensity across said outlet terminals is limited to a maximum of 50 milli-amperes.

4,169,380
ELECTRONIC CIRCUIT ARRANGEMENT

Peter Mansfield, Chilwell, and Terence Baines, Beeston, both of England, assignors to National Research Development Corporation, London, England

Filed Jul. 6, 1977, Ser. No. 813,423
Claims priority, application United Kingdom, Jul. 8, 1976, 28462/76
Int. Cl.[2] G01K *1/20*
U.S. Cl. 73—362.4 9 Claims



1. A display device comprising a parameter sensor, an analogue-to-digital converter to convert the output of the sensor to digital form, processor means for receiving digital signals from the converter and modifying the values of the said signals according to a non-linear scale, a counter, means for periodically transferring the digital signals from the processor means to the said counter, a constant rate clock pulse generator for stepping the counter, means for providing a sequence of timing signals each commencing with the transfer of a digital signal to the counter and terminating when the counter reaches a preset count, and display means giving an analogue visual indication of the durations of each of the timing signals in the said sequence.

4,169,381
BIMETAL OPERATED INDICATOR

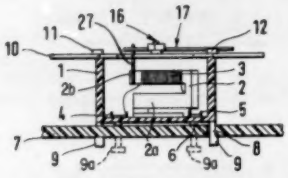
Arthur Skopil, Frankfurt, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 817,801, Jul. 1, 1977, abandoned. This application Dec. 13, 1978, Ser. No. 969,151

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1976, 2634017

Int. Cl.[2] G01K *5/54, 5/62*

U.S. Cl. 73—363.5 **9 Claims**



1. A bimetal operated indicator comprising: housing means;
bimetal means carrying a current measuring winding and having a fixed end mounted on said housing means and a driving end, and a pin carried by the driving end;
dial means supported on said housing means and carrying indicia;
said dial means having a front face on a side opposite said bimetal means;
shaft means mounted on said dial means and extending from said front face and having a free end with a radially enlarged head thereon;
pointer means having an indicating end and a driven end with a slot therein and having a shank portion between the ends with a hole therein for receiving said shaft means, and a pair of inturned, intersecting flanges on opposite edges thereof defining an opening aligned with said hole to receive said shaft means, said pointer means being held on said shaft means by engagement of said radially enlarged head with said inturned flanges, and said pin received in said slot to drive said pointer means;
said shaft means rotatably supporting said pointer means whereby said pointer means is precisely aligned relative to said indicia on said dial means to provide accurate indicating movement of said pointer means in response to deflection of said bimetal means with temperature change from current through said winding.

4,169,382
AQUARIUM THERMOMETER

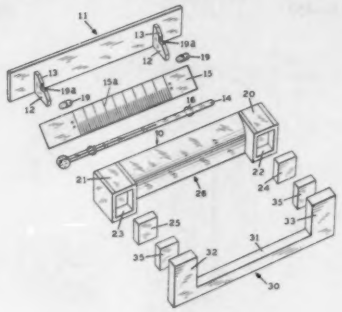
Marvin A. Goldman, Great Neck; Jerome N. Goldman, New York; Arthur Gilmore, Greenlawn, all of N.Y., and Silvio J. DiMarchi, Wychoff, N.J., assignors to Penn-Plax Plastics, Inc., Garden City, N.Y.

Filed Jun. 19, 1978, Ser. No. 916,500

Int. Cl.[2] G01K *1/14*

U.S. Cl. 73—376 **8 Claims**

1. An aquarium thermometer assembly comprising:
(a) an elongated one-piece housing of transparent, non-toxic, plastic having vertical front face portions;
(b) said housing having spaced end portions defining a spaced pair of first sockets at said vertical front face portions of said housing;
(c) first magnetic means disposed in said first sockets;
(d) a front window extending between said end portions;
(e) a rear wall of non-toxic plastic having integral forwardly projecting first leg means;
(f) said housing end portions each having integral second leg means generally juxtaposed with said first leg means;
(g) elongated glass thermometer means mounted on a planar scale member;
(h) said planar member being sandwiched between said first and second leg means;
(i) an elongated one-piece plastic positioning handle having second pair of spaced sockets formed at vertical rear face portions thereof;
(j) the spacing of said first and second pairs of sockets being substantially the same;



(k) second magnetic means being disposed in said second sockets;
(l) whereby, upon the face-to-face registry of said first and second magnetic means, said housing may be moved along an inner surface of an aquarium wall by selective displacement of said positioning handle along an outer surface of said aquarium wall.

4,169,383
PROCESS AND A DEVICE FOR THE INDICATION OF THE EXTENT OF UNBALANCE OF A PART TO BE BALANCED

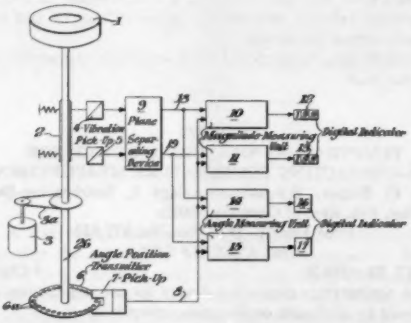
Volker Guyot, Buettelborn; Otfrid Maus, Darmstadt, and Martin Müller, Bickenbach, all of Fed. Rep. of Germany, assignors to Carl Schenck AG, Darmstadt, Fed. Rep. of Germany

Filed May 8, 1978, Ser. No. 903,478

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1977, 2724657

Int. Cl.[2] G01M *1/22*

U.S. Cl. 73—462 **12 Claims**



1. A process for the indication in digital form of the extent of unbalance of a body to be balanced in at least one plane in an unbalance measurement on balancing machines, comprising the steps of supplying an alternating voltage corresponding to the unbalance by a switch to an integrator by means of a delayless, non-linear input circuit for at least one revolution of the body to be balanced, after this (these) measuring revolution(s) supplying a reference voltage to the integrator until the inte-

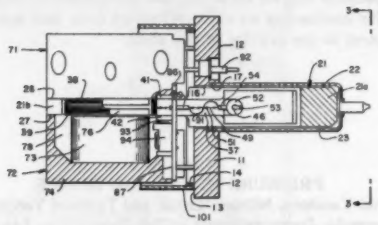
grator output voltage is thereby returned to zero, and during this return time, supplying pulses by an increment transmitter to a counter whose count results represent the extent of the unbalance.

4,169,384

LINEAR ACCELEROMETER MECHANISM

Philip D. Flanner, Pleasant Hill, and George G. Malcom, Walnut Creek, both of Calif., assignors to Systron-Donner Corporation, Concord, Calif.

Continuation-in-part of Ser. No. 725,030, Sep. 20, 1976, abandoned. This application Dec. 20, 1977, Ser. No. 862,389
Int. Cl.[2] G01P *15/08*
U.S. Cl. 73—516 R **23 Claims**



1. In a linear accelerometer mechanism a mounting flange having spaced parallel surfaces and an opening extending through the surfaces, removable means disposed in the opening in the mounting flange so that spaced portions of said removable means extend through said opening of the flange, said portions having spaced parallel surfaces extending at substantially right angles to the spaced parallel surfaces of the flange, said portions defining a space therebetween, said space extending through said opening, a pendulous moving system including a float, a pendulous elongate member having one end secured to the float, a cylindrical torque coil secured to the other end of the elongate member and a planar conducting element carried by the pendulous elongate member, means pivotally mounting the pendulous moving system to and between said portions of said removable means for movement about a pivot axis, magnetic means connected with said removable means and establishing a magnetic field about the torque coil, pickoff means fixedly disposed adjacent the planar conducting element, first and second covers disposed on opposite sides of the mounting flange and being secured to the mounting flange to provide a liquid-tight seal between the mounting flange and the covers to completely enclose said removable means and said pendulous moving system.

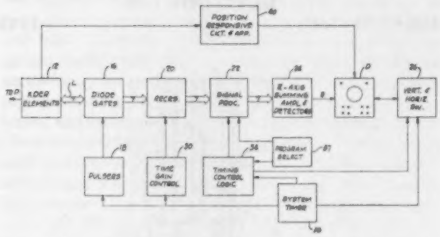
4,169,385

FREQUENCY SYNTHESIZER APPARATUS AND METHOD IN ULTRASONIC IMAGING

Seeley C. Kellogg, Durham; Philip J. Peluso, and Richard B. Bernardi, both of Cheshire, all of Conn., assignors to Picker Corporation, Cleveland, Ohio

Filed Feb. 21, 1978, Ser. No. 879,236
Int. Cl.[2] G01N *29/00*
U.S. Cl. 73—610 **4 Claims**

1. An ultrasonic medical diagnostic system, comprising:
(a) means for propagating ultrasonic energy through a subject;
(b) apparatus for producing electrical representations of ultrasonic echoes from within the subject;
(c) imaging electronics responsive to the electrical representations to produce information describing internal structure of the subject;
(d) said imaging electronics incorporating a delay element requiring for operation receipt of a program of frequency controlled signals;
(e) a system for synthesizing a program of output signal frequencies, comprising:
(i) an adjustable frequency generator;
(ii) a multi-channel memory for digitally storing representations of a set of frequencies corresponding to the



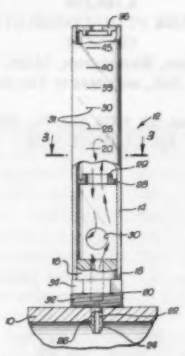
program frequencies in a plurality of address channels, each of said channels corresponding to a different predetermined program frequency, and
(iii) means for sequentially applying signals stored in the address channels for operating the adjustable frequency generator for producing the frequency program.

4,169,386

AGRICULTURAL WATER PRESSURE GAUGE

Walter C. McMahan, Rte 6., Box 2115, Escondido, Calif. 92025

Filed Feb. 8, 1978, Ser. No. 875,992
Int. Cl.[2] G01L *7/00*
U.S. Cl. 73—700 **9 Claims**



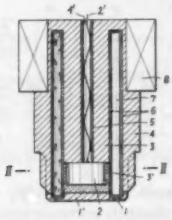
1. An agricultural water gauge comprising:
(a) a vessel;
(b) means forming a prong at one end of the vessel capable of penetrating the wall of a flexible conduit for relatively restricted bypass flow of fluid from the conduit to the interior of the vessel;
(c) said vessel being open to atmosphere at its upper end and being sized to receive water from said conduit as the vessel is oriented vertically with said prong lowermost;
(d) said vessel having a bleed port adjacent said prong end thereof and through which water exits at a rate corresponding to the height of water above said bleed port; and
(e) gauge markings on the vessel for measuring the height of liquid therein, and correspondingly, the pressure of water in said conduit.

4,169,387

TRANSDUCER FOR MECHANICAL MEASURED VARIABLES, ESPECIALLY A PRESSURE TRANSDUCER

Peter Krempl, Vienna, Austria, assignor to Hans List, Graz, Austria

Filed Dec. 5, 1977, Ser. No. 857,414
Claims priority, application Austria, Dec. 7, 1976, 9073
Int. Cl.[2] G01L 7/00
U.S. Cl. 73—708 **13 Claims**



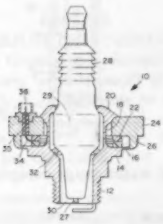
1. A transducer for measuring mechanical varibles having a housing and a heat pipe system arranged therein, said heat pipe system being heat-conductingly connected on one part thereof to the thermally stressed parts of the transducer, said heat pipe system comprising at least one self-contained closed receptacle, having walls at least partially lined with wick material to form a hollow space in said receptacle, a working fluid for wetting said wick material and being distributed by capillary action of the wick material, the working fluid circulating through the capillaries of the wick and the vapor of the working fluid circulating through said hollow space forming a closed loop, whereby heat transfer occurs by the convection of latent heat in the vapor phase of the fluid to improve the temperature balance within said hollow space.

4,169,388

INTEGRATED SPARK PLUG-COMBUSTION PRESSURE SENSOR

Bernard R. Teitelbaum, Birmingham, Mich., and John P. Carrico, Cockeysville, Md., assignors to The Bendix Corporation, Southfield, Mich.

Filed Dec. 13, 1978, Ser. No. 968,959
Int. Cl.[2] G01L 9/08
U.S. Cl. 73—714 **7 Claims**



1. An integrated spark plug-combustion pressure sensor for a spark ignited internal combustion engine, comprising,

a generally cylindrical shell having a threaded lower portion fitting a threaded opening in the engine combustion chamber, a shouldered bearing surface at the upper end of lower portion, a relatively thin-walled portion extending above said bearing surface and a crown portion at the upper end of said thin-walled portion;

a generally cylindrical insulator inserted in said shell, said insulator having a tapered lower portion, a bulging medial portion and an upper portion;

a spark electrode mounted axially within said insulator;

a thermally conductive gas-tight seal inserted between said insulator and said shell so as to bear on said insulator in the vicinity of the intersection of said medial portion and said tapered portion of said insulator and to bear on said shell in the vicinity of the intersection of said threaded portion and said thin-walled portion of said shell;

a pressure sensitive piezoelectric sensor element positioned on the upper surface of said shell shoulder;

a compression ring positioned atop said sensor element and bearing thereon; said shell crown bearing on said ring and being formed so as to statically compress said ring against said sensor element and said insulator against said seal;

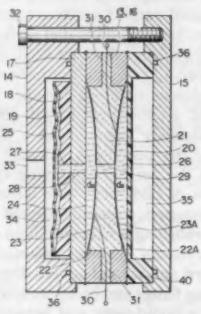
means extending between said shell shoulder and said compression ring for enclosing said sensor element; and means for conducting an electrical signal from said sensor element to the exterior of said shell.

4,169,389

PRESSURE MEASURING DEVICE

Takeshi Yasuhara; Mitsuru Tamai, and Tadanori Yuhara, all of Kawasaki, Japan, assignors to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed May 15, 1978, Ser. No. 906,170
Claims priority, application Japan, May 14, 1977, 52-54865
Int. Cl.[2] G01L 9/12
U.S. Cl. 73—718 **5 Claims**



1. A pressure measuring device comprising:

(a) a block member having first and second insulating walls, said walls being respectively provided with displacement detecting elements,

(b) a metal fixing plate covering the first insulating wall to provide a first liquid chamber defined therebetween,

(c) a sealing diaphragm covering the metal fixing plate to provide a second liquid chamber defined therebetween, said sealing diaphragm being exposed to an input pressure,

(d) a metal sensing diaphragm covering the second insulating wall to provide a third liquid chamber defined therebetween, said sensing diaphragm being exposed to a reference pressure, said sealing diaphragm being extremely flexible in comparison with the metal sensing diaphragm,

(e) a first hole formed in the block member to provide fluid communication between the first chamber and the third chamber,

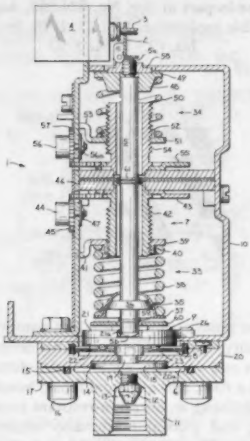
(f) a second hole formed in the fixed plate to provide fluid communication between the first chamber and the second chamber, and

(g) a non-compressible fluid sealed within and filling the first, second, and the third chambers.

4,169,390
ADJUSTING MECHANISM FOR A SNAP-ACTING BELLEVILLE WASHER

Phillip E. Schultz, Milwaukee, and Robert G. Crepeau, Greendale, both of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Mar. 20, 1978, Ser. No. 890,613
Int. Cl.[2] H01H *35/24*
U.S. Cl. 74—2 **11 Claims**



1. In a pressure control assembly having a snap-acting Belleville washer responsive to fluid pressure, and a switch actuating mechanism movable therewith, adjusting means for adjusting the snap pressure of the Belleville washer comprising:

a first plate member,

said first plate member having at least one oblique slot formed therethrough;

a second plate member disposed coaxially with said first plate member and rotatable with respect to said first plate member,

said second plate member having at least one radial slot formed therethrough; and

a pin member projecting through opposing oblique and radial slots to engage the surface of said snap-acting Belleville washer and provide a pivot point thereon, said pin member being radially adjustable along the surfaces of said snap-acting Belleville washer by rotating said second plate member.

4,169,391
VARIABLE SPEED TRANSMISSION

Abram Schonberger, 4608 E. Linebaugh, Tampa, Fla. 33617, assignor to Abram Schonberger, Tampa, Fla.; John L. Traina, Anniston, Ala. and Hugo Goodyear, Brandon, Fla.

Filed Dec. 20, 1976, Ser. No. 752,128
Int. Cl.[2] G01C *19/02*; F16H *3/74*
U.S. Cl. 74—5 R **7 Claims**

1. An automatic, infinitely variable, mechanical power transmission embodying the principles of rotor dynamics, in its simplest form comprising:

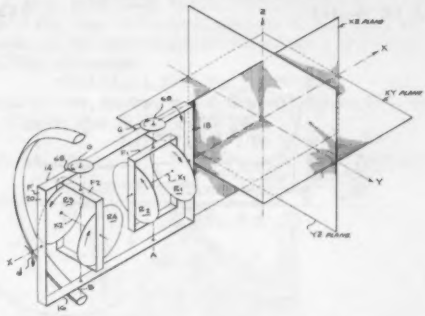
(a) a main frame enclosed in a transmission housing, collinearly disposed on its longitudinal axis between the input power shaft and the output power shaft, said output shaft being rigidly affixed to the said main frame, and said input shaft being journalled relative to the structure of the said main frame for independent rotation of the said main frame;

(b) two identical sub-frames mounted on parallel, hollow, interrupted shafts rigidly affixed to the inner structure of the said main frame, said interrupted shafts disposed on axes orthogonal to the longitudinal axis of the said main frame, said input power shaft connected to the said sub-frames via a gear and worm train disposed longitudinally along the said main frame;

(c) four identical rotors coaxially mounted in operative pairs on stub axles, each said pair of rotors enclosed in one of the said sub-frames, said stub axles disposed on spinning axes which intersect orthogonally the rotation axes of the two said sub-frames, each said rotor consisting of a hub having three identical, equally spaced, sleeved radial arms and three identical, circumferentially separated, equally spaced, radially shiftable arcuate sectors, each said arcuate sector being the terminus of each said radial arm, the three said arcuate sectors of each rotor being mutually interleaved and containing most of the mass of each said rotor;

(d) four identical hydraulic impellers disposed in pairs within each said sub-frame, each said impeller coaxially mounted and integral with one of the said rotors, each said impeller being further disposed between its functionally associated rotor and the adjacent internal structure of its said sub-frame, and enclosed in an impeller housing rigidly affixed to the interior of its said sub frame; and all four said impellers being functionally a part of the overall hydraulic means;

(e) two identical toroidal stators disposed circumferentially about the said main frame on plane coincident with the rotation of the encompassed sub-frames and orthogonal to the longitudinal axis of the said main frame, each said stator comprising a fixed outer ring fitted with a rotatable



inner slip ring, said outer ring having vanes disposed on its inner surface, and being rigidly affixed to the interior of the said transmission housing, and the said fitted inner slip ring being rigidly secured to the said main frame by a double conduit, said double conduit and said stator together comprising a link in the said hydraulic means;

(f) two identical camming means, each said camming means being functionally associated with one of the said sub-frames with its encompassed said pair of rotors and consisting of two identical eccentric cam tracks, a bridle, two annular discs, and two camming discs; said two eccentric cam tracks being affixed to the interrupted shafts of its associated said sub-frame; said bridle being disposed coaxially between the two said rotors of a pair and terminating in the two said annular discs, with center openings thereto to provide clearance for the stub axles of the said paired rotors, said two annular discs being disposed to operate against the two camming discs with ball bearings seated in raceways between them; said camming discs each having a plurality of camming pins projecting outwardly and engaging slidably with camming slots in the sleeves of the said arcuate sectors, and further, said camming discs being splined to said stub axles for common spinning with their respective said pair of rotors;

(g) a hydraulic means utilizing an incompressible fluid and consisting of the four said impellers, the two said stators, a pump, a pressure control valve, and interconnecting

conduits; said pump and said pressure control valve being disposed externally of the said main frame, said conduits leading from the said pump along the inner surface of the transmission housing and connecting to the stators affixed thereto, said conduits continuing through the interrupted shafts of the said sub-frames along the inner periphery of the said sub-frames and tangentially into the impellers, with exit conduits from the hub area of the impellers affixed to the exterior of said sub-frames, exiting through the main frame through leak-proof rotary fittings affixed to the hollow, interrupted shafts between the sub-frame and the main frame to conduits affixed to the exterior of the main frame, thence engaging into the main frame and disposed transversely along the interior of the said main frame, and exiting the said main frame via an oil ring fitted to the said output power shaft and continuing to the pump via the said pressure control valve to complete the hydraulic circuit; and,

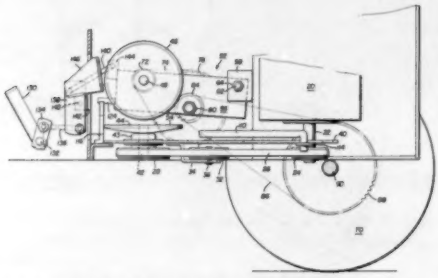
(h) An infinitely variable torque conversion means utilizing the aforestated components and means in proper combination and disposition thereby to transmit a wide range of net torques to the output power shaft.

4,169,392

SELF-ENERGIZING FRICTION DRIVE TRANSMISSION

Raymond F. McDonald, Winneconne, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed May 17, 1977, Ser. No. 797,707
Int. Cl.[2] F16H *15/10*; A01D *69/8*
U.S. Cl. 74—197 **2 Claims**



1. A self-energizing friction disc transmission, comprising:

a drive disc rotatably mounted on a generally vertical axis, said drive disc mounted on a laterally swingable support, said support singable about a vertical axis generally parallel to and spaced from said vertical drive disc axis,

a driven friction disc supported on a frame means rotatable about a horizontal axis above said drive disc, said friction disc rotatably mounted on a first shaft supported on said frame means, said first shaft having a sprocket rotatable with said friction disc,

said frame means supported on a horizontal pivot axis spaced from said horizontal rotational axis of said friction disc,

a second shaft rotatably supported on said frame means between said first shaft and said pivot axis of said frame, said second shaft being rotatably mounted on said frame means below said first shaft and said pivot axis of said frame, a large and a small sprocket supported for rotation in unison on said second shaft,

a wheel axle sprocket mounted on a horizontal wheel axle for driving the wheels of a ground traversing vehicle,

a first chain entrained on said first shaft sprocket and said large second shaft sprocket rotatably driving said second shaft and a second chain entrained on said small sprocket of said second shaft and said wheel axle sprocket rotatably driving said axle,

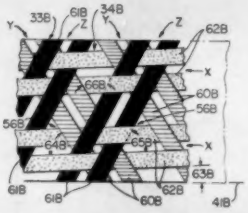
and said wheel axle sprocket vertically spaced below and to the rear of said first shaft, second shaft, and pivot axis of said frame, whereby the tension in said second chain compresses said friction disc against said drive disc in proportion to the torsional load on said axle.

4,169,393

ENDLESS POWER TRANSMISSION BELT, METHOD OF MAKING SAME, AND DRIVE SYSTEM USING SAME

Robert E. Wetzel, Springfield; Joseph P. Miranti, Jr., Nixa, and Donald D. Hall, Springfield, all of Mo., assignors to Dayco Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 824,580, Aug. 15, 1977, abandoned. This application Jan. 23, 1978, Ser. No. 871,669
Int. Cl.[2] F16G *5/22*
U.S. Cl. 74—233 **41 Claims**



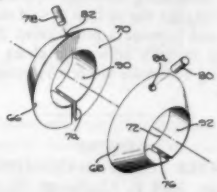
1. An endless power transmission belt comprising, a portion having a plurality of spaced belt elements defined by alternating projections and recesses, each of said elements having an outer part and a root, and a triaxial fabric bonded against said elements and defining an abrasion-resistant exposed surface of said elements, said triaxial fabric also minimizing shearing stresses in each element due to improved tear resistance thereof, said triaxial fabric being defined by three angularly displaced sets of parallel courses of yarn interwoven to prevent slippage of at least one yarn course set along any other yarn course set.

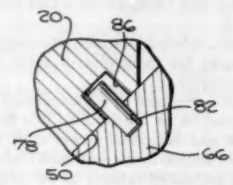
4,169,394

ANTI-DIFFERENTIAL DEVICE

Jose L. Estrada, Long Beach, Calif., assignor to Phalanx Corporation, Long Beach, Calif.

Filed Sep. 12, 1977, Ser. No. 832,072
Int. Cl.[2] F16H *1/40*
U.S. Cl. 74—713 **7 Claims**





1. In an automotive axle differential comprising a rotatable casing and a differential mechanism therein, including axle coupled side gears, non-slip structure blocking relative rota-

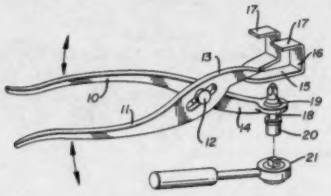
tion between an unloaded axle and said casing, said structure comprising for each axle a constricting guide surface circularly disposed about said axle radial and a split ring, frusto conical, constrictable guide follower having cylindrical bore and an annular base portion coaxial with said axle said follower being laterally displaceable by said side gear in side-thrusting response to loading of said axle to simultaneously radially mutually bind said casing and said axle.

4,169,395

SCREW REMOVING TOOL

James H. Hoskinson, 10118 Duck Creek Rd., Salem, Ohio 44460

Filed Feb. 27, 1978, Ser. No. 881,793
Int. Cl.[2] B25B *7/00, 7/02*
U.S. Cl. 81—5.1 R **5 Claims**



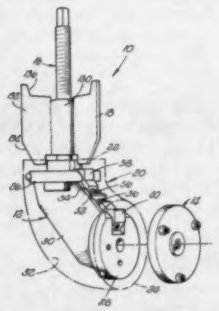
1. A device for removing a screw from a workpiece comprising a pliers-like tool having pivoted jaws of substantially equal length, an extension on one jaw, said extension comprising a U-shaped bracket, one portion of said U-shaped bracket extending axially from said one jaw, the other portion of said U-shaped bracket positioned in outwardly spaced relation with respect to said one portion so as to form an offset hook-like configuration that can be hooked over said workpiece on the opposite side thereof from said screw and a screwdriver rotatably mounted in an opening in the other jaw in oppositely disposed relation to said U-shaped bracket, means for rotatably securing said screwdriver in said opening, said screwdriver being engagable in said screw to be removed and a wrench for rotating said screwdriver.

4,169,396

ELBOW MANDREL ARRANGEMENT

William H. Astle, Rancho Cordova, Calif., assignor to Tri Tool, Inc., Placerville, Calif.

Filed Mar. 3, 1978, Ser. No. 883,178
Int. Cl.[2] B23B *3/00, 3/22*
U.S. Cl. 82—1 L **28 Claims**



22. A method of mounting a pipe tool for rotation relative to a pipe bend for performing a machining operation thereon which comprises:

placing a mandrel support frame into a first open end of said pipe bend such that a first outward facing surface portion of said mandrel support frame is adjacent said first open end;

locking said mandrel support frame in place relative to said pipe bend;

loosely engaging a threaded section of a mandrel shaft means with a first captive nut within said mandrel support frame to provide said mandrel shaft means projecting perpendicularly from said first outward facing surface portion and able to move between a plurality of predetermined positions thereon;

centering said mandrel shaft means relative to said first open end;

locking said mandrel shaft means in place relative to said pipe elbow by tightening said threaded section into said captive nut; and

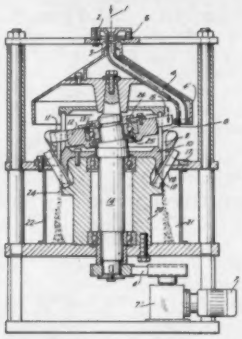
mounting said pipe tool for rotation relative to said mandrel shaft means.

4,169,397

DEVICE FOR PROCESSING A FIBROUS CABLE CONTINUOUSLY FED AT A HIGH SPEED

Ernst Vehling, Bordesholm, and Johann Ratjen, Willenscharen, both of Fed. Rep. of Germany, assignors to Neumünstersche Maschinen- und Apparatebau Gesellschaft mbH, Neumünster, Fed. Rep. of Germany

Filed May 1, 1978, Ser. No. 901,292
Claims priority, application Fed. Rep. of Germany, May 13, 1977, 2721665; May 20, 1977, 2722788
Int. Cl.[2] D01G *1/04*
U.S. Cl. 83—100 **15 Claims**



1. A device for processing a continuously advancing fibrous cable comprising: an upright shaft supported for rotation about its axis, a downwardly projecting guiding member rotatable together with said shaft, said guiding member having an upper part coaxially arranged with said shaft and an outlet part directed downwardly and away from said shaft, a stationary cylindrical member arranged about said shaft and having a plurality of vertically directed slots provided in its periphery; a wobble plate disposed within said stationary cylindrical member around said shaft and having a plurality of fingers projecting through corresponding slots in said cylindrical member, said wobble plate being driven by said shaft for performing wobbling movement in a plane inclined relative to said shaft, the uppermost fingers of said wobble plate being directed opposite to the outlet of said guiding member to wind the cable on the cylindrical member under the pressure of said fingers.

4,169,398
FILAMENT CUTTING

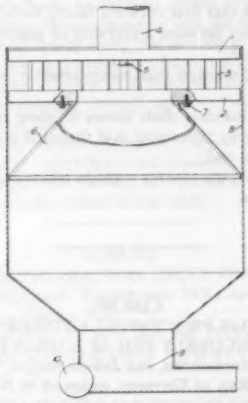
Cyril Wadsworth, and Horace E. Amstell, both of Harrogate, England, assignors to Imperial Chemical Industries, Inc., Great Britain

Continuation of Ser. No. 724,193, Sep. 17, 1976, abandoned. This application Feb. 9, 1978, Ser. No. 876,388

Claims priority, application United Kingdom, Sep. 18, 1975, 38409/75

Int. Cl.[2] D01G *1/04*

U.S. Cl. 83—346 3 Claims



1. Apparatus for cutting continuous filamentary material into shorter lengths comprising a substantially circular assembly of spaced outwardly facing knife blades secured to a reel having upper and lower knife mounting members, the lower member being apertured for passage of cut filamentary material, means to rotate the reel and to continuously wrap successive layers of filamentary material around the reel against the knife blades, means exerting radial pressure on the wrapped material at at least one point and a divergent surface attached around the periphery of the aperture in the lower mounting member and extending outwardly to a diameter substantially equal to the diameter of said lower mounting member, said divergent surface being dependent from said lower mounting member and rotating therewith.

4,169,399
ELECTRONIC DEVICE FOR CONTROLLING THE FUNCTION OF AN ELECTRONIC YARN CLEARER

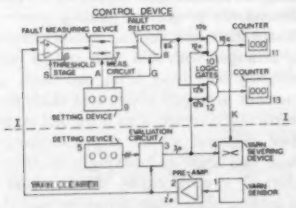
Rolf Glöckner, Egg; Hans Späni, Zürich, and Hansruedi Stutz, Dietlikon, all of Switzerland, assignors to Gebrüder Loepfe AG, Wetzikon, Switzerland

Filed Jun. 12, 1978, Ser. No. 914,886

Claims priority, application Switzerland, Jun. 17, 1977, 7447/77

Int. Cl.[2] B26D *5/38*

U.S. Cl. 83—361 10 Claims



1. An electronic device for controlling the function of an electronic yarn clearer which comprises a sensing device for producing a sensing signal representative of a transverse dimension or the deviations of a transverse dimension of a traveling yarn, an evaluation circuit operatively connected to the sensing device for detecting and evaluating yarn faults and producing yarn severing pulses upon appearance of undesirably great yarn faults, and a yarn severing device operatively connected to the evaluation circuit; the electronic control device comprising:

fault measuring means whose input is the sensing signal, for generating fault measuring signals representative of the magnitude values of the yarn faults;

fault selector means whose input signals are fault measuring signals, for furnishing output signals only upon appearance of fault measuring signals whose magnitude values exceed predetermined boundary values; and

at least one gate circuit for logically combining the output signals of the fault selector means and the yarn severing pulses.

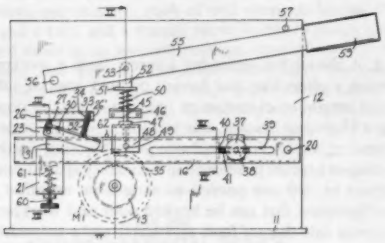
4,169,400
CABLE ARMOR CUTTING MACHINE

Lucien C. Ducret, 8 Apache Pl., Riverside, Conn. 06878

Continuation-in-part of Ser. No. 703,669, Jul. 8, 1976, Pat. No. 4,103,578. This application Apr. 27, 1978, Ser. No. 900,434

Int. Cl.[2] B26D *7/02*

U.S. Cl. 83—409 11 Claims



1. A cable armor cutting machine comprising, a fixed support, a motor mounted on said support, a saw operatively connected to said motor, a cable guide connected to the support and movable toward and away from said saw, a cable clamping means movable into and out of engagement with the cable, and operating means adapted to move the clamping means into engagement with the cable at a point substantially opposite the saw and to move the cable into cutting engagement with the saw, the clamping means being a vertically movable plunger and the operating means including a lever pivotally connected at one end to the fixed support and connected to the plunger in a relation which provides a mechanical advantage to the operation of the plunger, the cable guide being elongated and pivoted at one end to the support, the opposite end being the cable input end, and cable centering means being carried by the guide adjacent said input end.

4,169,401
CIRCUIT FOR REDUCING SOLENOID HOLD-IN POWER IN ELECTRONIC PLAYER PIANOS AND SIMILAR KEYBOARD OPERATED INSTRUMENTS

Henry V. Walker, Franklin, Tenn., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed May 2, 1977, Ser. No. 792,849

Int. Cl.[2] G10C *3/20*

U.S. Cl. 84—22 3 Claims

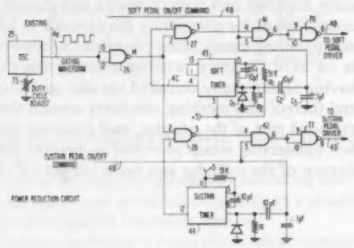
1. In an electronic keyboard player musical instrument having solenoid-operated soft and sustain pedals, a plurality of transistor switch means, one transistor switch means being connected to each of said solenoids, respectively, for controlling the voltage supplied to said solenoids and a source of "on"

and "off" signals for each of said transistor switch means, the improvement comprising:

means for reducing the hold-in power supplied to said solenoids after the occurrence of said "on" signal, including, for each solenoid of said solenoid-operated pedals:

(1) logic circuit means for applying said "on" signal from said source of "on" and "off" signals to said transistor switch means to turn same "on" for a predetermined time interval sufficient to fully actuate said solenoid,

(2) a timing circuit, connected to receive said "on" signal from said source of "on" and "off" signals and initiate said



predetermined time interval following the onset of said "on" signal,

(3) a source of periodic pulses having a predetermined rate and a predetermined pulse width, and

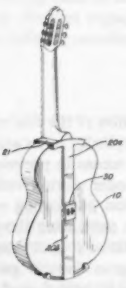
(4) means controlled by said logic circuit for supplying said periodic pulses to said transistor switch means after said predetermined time interval as determined by said timing circuit to thereby reduce the average energy supplied to said solenoid after it has been fully activated to an energy level sufficient to maintain said solenoid actuated for as long as said "on" signal is present.

4,169,402

ISOLATED GUITAR BODY

Neil L. Wood, 1800 N. Lincoln Ave., Chicago, Ill. 60614

Filed Feb. 6, 1978, Ser. No. 823,105
Int. Cl.[2] G10D *1/08, 3/12*
U.S. Cl. 84—291 **6 Claims**



1. A stringed musical instrument, comprising:

a body comprising a top soundboard, a bottom soundboard, and side member means connecting said soundboards to form a resonant chamber within said body, said soundboards having no supporting braces connected thereto;

a frame mounted externally of said body for floatingly supporting said body, said frame comprising a neck, a tailpiece, and bar means rigidly connecting said neck and tailpiece; means contacting said body substantially along the edges of said soundboards for floatingly supporting said body above said bar means; and strings connected to said neck and tailpiece, the tension of said strings being resisted solely by said frame.

4,169,403

BOMB CIRCUIT DISRUPTING DEVICE AND METHOD

Ralph W. Hanson, 6401 Goodrich Ave., St. Louis Park, Minn. 55426

Filed Aug. 4, 1978, Ser. No. 931,191
Int. Cl.[2] F42D *5/04*
U.S. Cl. 86—1 B **8 Claims**

1. A device disrupting a bomb circuit within a bomb housing, having in combination

an elongated housing having a missile chamber and a firing chamber therein,

releasable seal means separating said chambers,

said missile chamber having a discharge opening and an unrestricted passage through said missile chamber and said discharge opening,

a releasable seal overlying said discharge opening,

a liquid missile in said missile chamber,

means in said firing chamber generating an expanding gas,

said expanding gas expelling said missile rupturing and disrupting said bomb housing therewith in a faster period of time than that required for detonation of the bomb within said housing and wetting the interior of said bomb housing to prevent a fire outbreak, and

said expanding gas following directly upon said missile entering and further disrupting the contents of said bomb housing.

6. The method for disrupting a bomb circuit within a bomb housing consisting of the steps of

a. Disposing a non-combustible liquid into an elongated unrestricted chamber and forming a missile therewith,

b. Removably sealing said liquid in said chamber,

c. Providing an expanding gas generating means in a chamber adjacent said missile chamber,

d. Separating said chambers by releasable means,

e. Firing said gas generating means to expel said missile to rupture said bomb housing and disrupt the contents thereof at a speed greater than the time required for the detonation of the bomb, and

f. Further disrupting the contents of said bomb housing by the passage of said gas into said bomb housing.

4,169,404

FLUID PRESSURE ACTUATOR

Akira Tsuchihashi, Nagareyama, Japan, assignor to Hitachi, Ltd., Japan

Filed Mar. 30, 1978, Ser. No. 891,625
Int. Cl.[2] F01B *13/00*
U.S. Cl. 91—61 **4 Claims**

1. A fluid pressure actuator comprising:

a first member;

a second member;

a first flange and a second flange formed and located in spaced-apart relationship on one of said first member and said second member;

a cylindrical bore formed in the other of said first member and said second member for receiving said first flange and said second flange fitted therein;

a partition plate mounted in the other of said first member and said second member and located between said first

flange and said second flange in such a manner that said partition plate extends radially inwardly to said one of said first member and said second member;

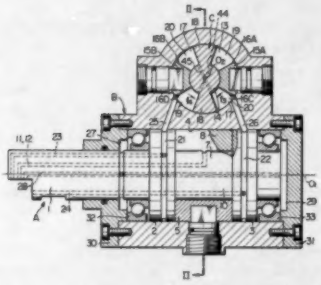
a first pressure chamber of a circularly arcuate shape defined between said first member and said second member and having an end located in the direction of movement of said second member;

a first partition formed integrally with said first member for dividing said first pressure chamber into a first compartment and a second compartment;

a first passage formed in said first member for communicating said first compartment with a fluid pressure generating means so as to enable said second member to rotate relative to said first member by a fluid supplied under pressure to said first compartment through said first passage;

a second pressure chamber defined between said second member and said third member and having an end located in the direction of movement of said third member;

a second partition formed integrally with one of said second



member and said third member for dividing said second pressure chamber into third compartments and fourth compartments;

a second passage of annular or arcuate shape concentric with said cylindrical bore and formed in a portion of said first flange maintained in contact with a wall of said cylindrical bore;

a third passage formed in said first member for communicating said second passage with said fluid pressure generating means;

a fourth passage formed in said second member for communicating said second passage with said third compartments so as to enable said third member to move relative to said second member when the fluid is supplied under pressure to said third compartments through said fourth passage;

an annular chamber concentric with said cylindrical bore and located opposite said second flange with respect to said second passage; and

a drain passage formed in said first member and communicating with said annular chamber.

4,169,405

CONTROL APPARATUS

Shiro Tsunemoto, Edosaki; Teruki Mizuguchi, and Eiichi Hirayama, both of Azuma, all of Japan, assignors to Fuji Plastic Co., Tokyo, Japan

Division of Ser. No. 565,546, Apr. 7, 1975, Pat. No. 4,088,064. This application May 5, 1978, Ser. No. 903,205

Claims priority, application Japan, Apr. 10, 1974, 49-40475

Int. Cl.[2] F15B *15/24*

U.S. Cl. 92—13.6 **2 Claims**

1. A control apparatus, comprising:

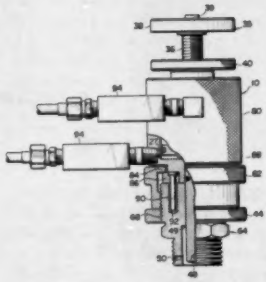
a cylinder having one end closed to form a chamber, and fluid introducing and discharging means to introduce a control fluid into said chamber and discharge the fluid from the chamber comprising a pair of apertures passing through said cylinder and spaced apart from one another in the axial direction of said cylinder;

a piston having a head slidable within the chamber in its axial direction between the pair of apertures, and a rod integral with the head, said rod extending outwardly through the bottom of the cylinder;

control means variably extending inside the chamber through the closed one end of said cylinder, the sliding motion of the piston head being defined by the control means and the bottom of said cylinder;

an adaptor for fixedly mounting the control apparatus to a member to be controlled, said adaptor having an externally threaded part formed at one end thereof;

coupling means for connecting the cylinder to said adaptor, said coupling means being rotatable to move the cylinder in its axial direction without rotating the cylinder and having an internally threaded annular part formed at one end thereof and meshing annularly around the externally threaded part of the adaptor, said coupling means having first connecting means provided around the outer circumference of the cylinder and being capable of abutting the



cylinder, the rotation of the first connecting means, serving to move the cylinder in its axial direction;

rotation preventing means to prevent rotation of said adaptor and said cylinder during rotation of said coupling means, said rotation preventing means including second connecting means permitting the cylinder to move in its axial direction relative to said adaptor;

said cylinder having an annular groove formed along the outer circumference thereof, said first connecting means having an inwardly projecting member engaged with the annular groove; and the second connecting means having a pin, one end of which is fixed to one of the cylinder and the adaptor with the other end being slidable along an axial hole bored in the other member;

said second connecting means having a ring member fixed to said cylinder so as to sandwich said inwardly projecting member between said ring member and said cylinder in a manner that the annular groove remains left therebetween, one end of the pin being fixed to the ring member and the other end being movably inserted into the axial hole provided in the adaptor.

4,169,406

BOX-FOLDING MACHINE AND METHOD OF SETTING UP SAME

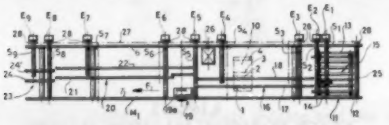
Horst Tanham, Wuppertal, Fed. Rep. of Germany, assignor to Escomat Maschinenbau Schmitt & Co., Wuppertal, Fed. Rep. of Germany

Filed Nov. 30, 1977, Ser. No. 856,334

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1976, 2654641

Int. Cl.[2] B31B *1/14*

U.S. Cl. 93—49 AC 8 Claims



1. An apparatus for folding a flat blank into a collapsed box, said apparatus comprising:

transport means having a longitudinally extending conveyor for displacing a blank longitudinally through a plurality of longitudinally spaced treatment stations;

treatment means including a respective treatment element at each of said stations displaceable transversely of said conveyor and engageable with a blank thereon for folding a blank passing longitudinally through said station on said conveyor into a collapsed box;

alignment means including an alignment guide extending transverse to said conveyor and a plurality of positioning defining members each associated with a respective treatment element, said position defining members being slidable along said guide and fixable thereon and each including a switch;

scanning means including a single scanning element displaceable parallel to said alignment guide and arranged for engagement with the switch of each position defining member;

actuator means connected to said treatment elements for joint and synchronous displacement of the treatment elements in a direction transverse to said conveyor; and

control means in circuit with said switches of said plurality of position defining members and connected to said actuating means for arresting each of said treatment members when said scanning element engages the switch of the respective position defining member.

4,169,407

SIDE WALL CONSTRUCTION FOR A CONTAINER FOR SHIPPING GOODS

Willi Dorpmund, Elze, Fed. Rep. of Germany, assignor to Graaff Kommanditgesellschaft, Fed. Rep. of Germany

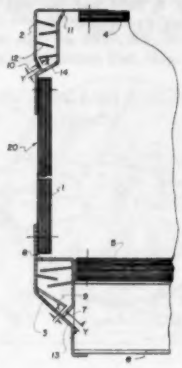
Filed Oct. 20, 1977, Ser. No. 844,059

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1976, 2648666

Int. Cl.[2] F24F *13/00*; B65J *1/02*

U.S. Cl. 98—32 7 Claims

1. A side wall construction for a container for shipping goods, comprising a side wall having upper and lower hollow tubular chords, each having a plurality of openings which are vertically offset and diagonally oppositely located relative to each other, and a plurality of downwardly inclined and oppositely directed deflectors within each of said upper and lower chords disposed between the openings of respective ones of said chords, a bottom connected to said lower chord having a cross-beam, said lower chord having a lowermost opening



directed toward said cross-beam and an uppermost opening leading to the interior of said container.

4,169,408

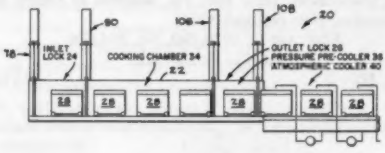
CONTINUOUS PRESSURE COOKER AND COOLER WITH CONTROLLED LIQUID FLOW

Samuel A. Mencacci, San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.

Continuation-in-part of Ser. No. 767,277, Feb. 10, 1977, abandoned. This application Mar. 25, 1977, Ser. No. 781,405

Int. Cl.[2] A47J *27/08*

U.S. Cl. 99—355 25 Claims



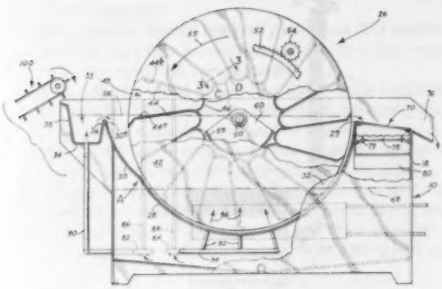
1. In a continuous pressure cooker and cooler having a pressure vessel with an inlet and an outlet pressure lock, and liquid circulating means for directing a heat treatment liquid into said pressure vessel; the improvement which comprises a processing vessel movable through said pressure vessel, a liquid-tight tub included in said processing vessel positioned to receive and be filled with a heat treatment liquid through an elevated inlet means thereon and having an overflow edge before the top of said inlet means over which the liquid flows during processing for collection in a shallow pool in the bottom of the pressure vessel externally of and below the level of said tub, container supporting means disposed within said tub defining a tunnel having an inlet end and an outlet end, means in said tunnel for supporting the containers in spaced parallel rows with all containers being below the liquid level in the tub as defined by said overflow edge, and flow control means associated with said container supporting means for causing relative motion of said processing liquid and said containers in a direction parallel to said rows of containers.

4,169,409

FOOD PROCESSING EQUIPMENT

James W. Haubner, P.O. Box 1065, La Grande, Oreg. 97850

Filed Apr. 5, 1978, Ser. No. 893,702
Int. Cl.[2] A23N *7/01*
U.S. Cl. 99—629 9 Claims



1. Produce processing equipment comprising

a drum rotatable about a substantially horizontal axis having pockets distributed circumferentially thereon which pockets have open mouths facing outwardly on the drum, and powered means for rotating said drum,

tank means constructed to hold a pool of liquid with such submerging a lower portion of said drum, the periphery of the drum on rotation of the drum moving into and out of such pool,

said tank means including means forming a weir adjacent where the periphery of the drum moves out of such pool, and

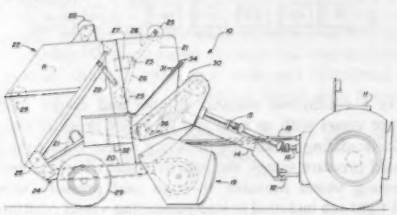
means for circulating liquid through said tank means with such pool during circulating of the liquid having a liquid level established by said weir, said means for circulating liquid producing a current of liquid which flows through a pocket and over said weir with the pocket positioned with its mouth opposite the weir.

4,169,410

INDEPENDENTLY CONTROLLED TWINE KNIVES

John S. Richardson, Terre Hill, Pa., assignor to Sperry Rand Corporation, New Holland, Pa.

Filed Apr. 7, 1978, Ser. No. 894,456
Int. Cl.[2] B65B *13/02*
U.S. Cl. 100—5 8 Claims



1. In a crop roll forming machine of the type having a bale forming region defined by bale forming means mounted on a mobile frame, wrapping means including a plurality of binding material dispensing means adjacent the bale forming region to dispense a binding material about a completed crop roll and drive means operatively connected to the bale forming means and the wrapping means, the improvement in the wrapping means comprising:

an elongate rod supported on the frame across and adjacent the bale forming region, the rod having concentrically mounted thereabout a plurality of rotatable sleeve means corresponding in number to the plurality of dispensing means;

a plurality of triggering means each one of which is associated, respectively with a corresponding one of the sleeve means to rotate the sleeve means about the longitudinal axis of the rod; and

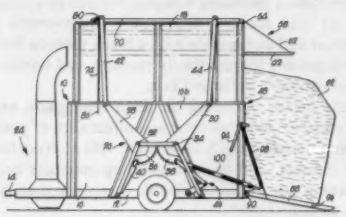
a plurality of severing means each cooperatively associated with a respective one of the sleeve means, whereby activation of the triggering means causes rotation of the sleeve means and a resultant actuation of the severing means to sever the binding material from each dispensing means.

4,169,411

STACK-FORMING MACHINE HAVING SPRING-POWERED, PRESS-CONTROLLED TAILGATE

Bruce L. Lutz, Hesston, and Richard J. Buller, Newton, both of Kans., assignors to Hesston Corporation, Hesston, Kans.

Filed Apr. 5, 1978, Ser. No. 893,280
Int. Cl.[2] B30B *5/00*
U.S. Cl. 100—255 8 Claims



1. In a machine wherein a crop stack is formed within a container having an outlet through which the stack may be discharged upon completion of the stack-forming process, and further having a door carried by one part of a pair of relatively telescoping parts comprising said container, said door being shiftable between opening and closing positions with respect to said outlet, a control for said door comprising:

means operably linking said door with the other part of said container for causing said shifting of the door in response to said telescoping of the parts,

said linking means maintaining a continuous interconnection between said door and said other part of the container throughout all telescoping of the parts, including that telescoping which occurs when the door is held in its closing position,

said linking means including relief means disposed for permitting said door to be selectively held in said closing position notwithstanding said telescoping of the parts.

4,169,412

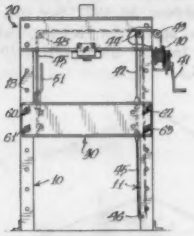
SHOP PRESS

Gregory A. Stelmasik, South St. Paul, and Richard T. Anderson, Burnsville, both of Minn., assignors to Owatonna Tool Company, Owatonna, Minn.

Filed Sep. 25, 1978, Ser. No. 945,260
Int. Cl.[2] B30B *15/06*
U.S. Cl. 100—257 8 Claims

1. In a shop press having side frame members and a bolster adjustably mounted thereon, releasable means at both ends of the bolster for fastening the bolster to the side frame members, means for adjusting the height of said bolster including a winch

and cable system with a pair of cable lengths operatively connected one to each end of the bolster, and means for deflecting



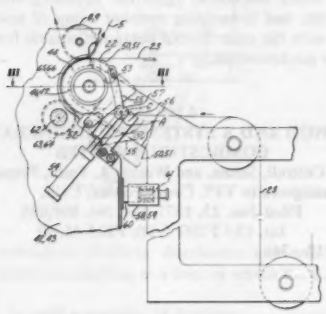
one of said cable lengths to effectively shorten said one cable length and raise the adjacent end of the bolster.

4,169,413

BELT PRESS WITH SEPARABLE WEB-HANDLING AND BELT-SUPPORTING ASSEMBLIES

Charles Aaron, West Caldwell, N.J., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Feb. 21, 1978, Ser. No. 879,342
Int. Cl.[2] B41F *5/06, 5/10, 5/16*
U.S. Cl. 101—223 **12 Claims**



1. A belt-type printing press comprising:

(a) a stationary web-handling assembly comprising at least one impression roll which is rotatable about its longitudinal axis and over which a web advances as the roll rotates;

(b) a mobile belt-supporting assembly which is separable from the web-handling assembly and which comprises a plate roll and other strategically located rolls for supporting a continuous printing belt with attached printing plates, the plate roll being rotatable about its longitudinal axis;

(c) means for guiding the belt-supporting assembly to a position adjacent the web-handling assembly, where the plate roll is close to, and parallel with, the impression roll and forms with the impression roll a nip through which the web and printing belt pass;

(d) means carried by the web-handling assembly for engaging and holding the belt-supporting assembly about the plate roll axis to secure the plate roll in nip forming relation with the impression roll and for holding the plate roll in a position where the rotational axis of the plate roll is in fixed, parallel relation to the rotation axis of the impression roll; and

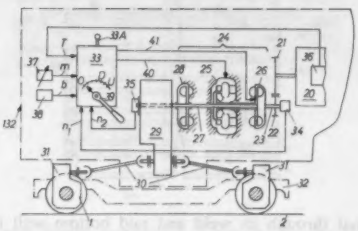
(e) means for rotating the rolls of the assemblies in synchronized relation.

4,169,414

ELECTROHYDRAULIC LOCOMOTIVE DRIVE

Helmut Müller, Heidenheim, Fed. Rep. of Germany, assignor to Voith Getreibe KG, Heidenheim, Fed. Rep. of Germany

Filed Apr. 14, 1977, Ser. No. 787,576
Claims priority, application Fed. Rep. of Germany, Apr. 24, 1976, 2618073
Int. Cl.[2] B61C *3/00, 9/34, 9/42, 15/00*
U.S. Cl. 105—61 **19 Claims**



1. An electrohydraulic drive for vehicles, particularly for locomotives, comprising a variable-speed electric motor; a hydrodynamic power transmission including an input element driven by said motor, an output element, a hydrodynamic torque converter engageable to transmit torque from said input element to said output element and a coupling engageable to transmit torque from said input element to said output element when said converter is disengaged; adjustable means for operating said motor at different loads, the tractive effort of said drive in engaged condition of said coupling during operating conditions including the speed of the vehicle and the setting of said adjustable means; and control means including means for engaging said coverter in a low speed range of the vehicle, means for engaging said coupling in a high speed range, said high and low speed ranges overlapping in an intermediate speed range wherein either said converter or said coupling is engageable, and means for initiating a changeover to engagement of said coupling in said intermediate speed range comprising a first component for generating a first signal denoting the momentary acceleration force, a second component for generating a second signal denoting the difference between the momentary tractive effort of the drive in engaged condition of said converter said momentary acceleration force, signal comparing means for generating a third signal denoting the ratio of tractive effort of the drive in engaged condition of said coupling at the momentary operating conditions to said second signal, and comparator means for generating a fourth signal when said ratio at least equals unity, said fourth signal initiating said changeover.

4,169,415

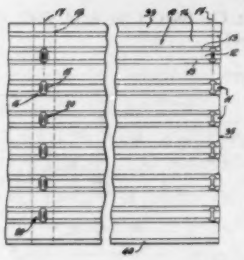
CORRUGATED STEEL WALL LINING FOR BOXCAR

Robert B. Winsor, Beaconsfield, Canada, assignor to IEC-Holden Ltd., Montreal, Canada

Filed Nov. 29, 1977, Ser. No. 855,699
Int. Cl.[2] B60P *7/08*
U.S. Cl. 105—483 **7 Claims**

1. A corrugated metal sheet for lining at least opposed side walls of a freight compartment having a plurality of spaced-apart vertical wall supports, said metal sheet comprising a plurality of spaced-apart elongated channels formed across a smooth top surface of said sheet, said channels extending horizontally and transverse to said vertical wall supports, each of said channels having a flat bottom wall spaced from said surface and opposed connecting walls extending from said bottom wall to said top surface, a plurality of spaced-apart apertures in said bottom wall of at least some of said channels to permit an attachment means to connect said sheet to a plurality of said vertical wall supports, said channels being configured to receive individual anchor bars for securement therein, each

anchor bar having an attachment part and opposed weldable end supports securable to a respective opposed connecting wall of said channel, said weldable end supports being welded in said channels in close non-interferring proximity to an associated one of said apertures so that said anchor bar is rigidly



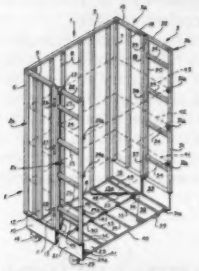
connected through its weld and said bottom wall in close proximity to said support whereby cargo retaining means may be attached to said attachment part to secure cargo in said freight compartment, said anchor bar also filling said associated channel in a bridge area to add rigidity to said corrugated metal sheet.

4,169,416

EGG CARTON DISPLAY RACK AND BASKET

Joseph R. Haynes, Norcross; William F. Wainwright, Roswell, and Frank D. Morris, Marietta, all of Ga., assignors to Fisher-Haynes Corp. of Georgia, Norcross, Ga.

Filed Nov. 16, 1977, Ser. No. 851,946
Int. Cl.[2] A47F 5/00
U.S. Cl. 108—26 **12 Claims**



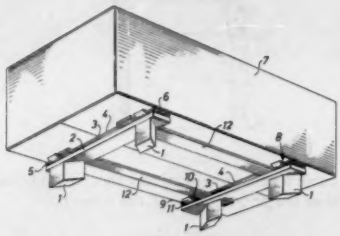
1. A collapsible basket for displaying egg cartons each having a plurality of egg receiving cells arranged in two parallel rows, said basket comprising a base having a plurality of transverse base rods and being of a width slightly greater than the length of an egg carton, and a side wall pivotally mounted on each side of said base, each side wall including a plurality of substantially parallel abutment rods, each abutment rod, the corresponding base rod, and the longitudinal center line of a carton being disposed in a common vertical plane whereby each carton is arranged to straddle a base rod with its ends in alignment with oppositely disposed abutment rods, certain of said base rods being formed with upturned ends and corresponding ones of said abutment rods being connected with said upturned ends respectively by pivot means, each of said pivot means comprising a pivot pin and high friction relatively movable contact surfaces.

4,169,417

SUPPORT FOOT DEVICE FOR LOAD CARRIERS

Åke O. V. Gemvik, Gökvägen 71, S-183 51 Täby, Sweden

Filed Nov. 30, 1977, Ser. No. 856,082
Claims priority, application Sweden, Dec. 15, 1976, 7614087
Int. Cl.[2] B65D 19/06, 19/40
U.S. Cl. 108—56.3 **13 Claims**



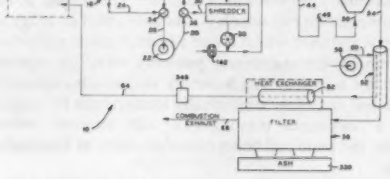
1. In combination with a load carrier having pocket means positioned on the bottom surface thereof, a support device comprising an elongate carrier plate and at least two support feet, spaced from each other, and being securably mounted on the bottom side of said carrier plate, a connecting member corresponding in general configuration to said carrier plate, directly and securably fastened in its central region to the top side of said carrier plate in the central region thereof, the opposing ends of said connecting member being contiguous with but freely disposable from the opposing ends of said carrier plate, said connecting member being of resilient construction with the ends thereof being deflectable for insertion within the pocket means.

4,169,418

METHOD AND A SYSTEM FOR INCINERATING COMBUSTIBLE WASTES

Henry L. Cottrell, Selma, and Wesley A. Faith, Fresno, both of Calif., assignors to VFE Corp., Fowler, Calif.

Filed Jun. 23, 1977, Ser. No. 809,094
Int. Cl.[2] F23G 5/00; F23J 15/00
U.S. Cl. 110—346 **6 Claims**



1. In a method for incinerating combustible gin waste, the steps of:

A. particlizing gin waste to form particles of substantially uniform size;

B. mixing said particles in a first flowing stream of atmospheric air;

C. igniting said particles by causing said particles to frictionally engage a surface of an ignition chamber heated to a temperature sufficient to ignite the particles in response to the engagement thereof with the surface in the presence of the atmospheric air;

D. suspending the ignited particles in a second stream of combustion-supporting air and downwardly expelling the second stream from the ignition chamber and thereafter

conveying the ignited particles suspended in said second stream to a combustion chamber along a further path segment sufficiently turbulent to assure continued combustion of the ignited particles as they are conveyed from the ignition chamber to a combustion chamber; and

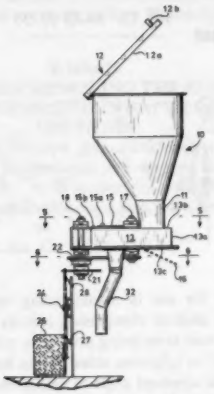
E. entrapping the ignited particles in the combustion chamber until the particles are consumed.

4,169,419

FERTILIZER DISTRIBUTOR

Roland A. Burgess, Courtland, Va., assignor to Union Camp Corporation, Wayne, N.J.

Filed Jun. 6, 1978, Ser. No. 913,097
Int. Cl.[2] A01C *11/00, 15/00*
U.S. Cl. 111—2 **4 Claims**



1. A combination fertilizer distributor and tree seedling planter to plant one seedling at a time in which the distributor comprises:

a hopper to hold a quantity of fertilizer;

a rotatable discharge wheel provided with a plurality of spaced open ended tubes;

a plurality of cone shaped inserts;

each said tube being adapted to receive said cone shaped inserts whereby the inserts can be of different capacities and therefore changed to permit calibration of the amount of fertilizer to be discharged from the tube;

a housing encasing said discharge wheel;

said housing having a top opening on one side of the housing positioned to permit fertilizer to feed from the hopper through the opening to fill the tubes on one side of the wheel and having a bottom opening positioned to permit fertilizer to discharge from one of the filled tubes;

tooth engaging sprocket wheel means interconnected to said discharge wheel to permit the operator to selectively move said sprocket wheel means one tooth at a time thereby successively bringing one filled tube at a time to said bottom discharge opening; and

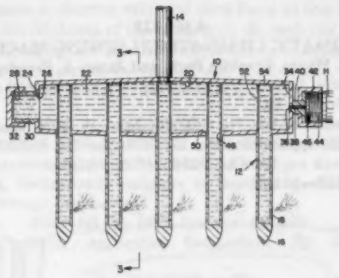
a spring loaded pedal mechanism, moveable by foot or by hand, linked to said sprocket wheel means whereby depressing the pedal by the operator will move said sprocket wheel means from one tooth to the next with the spring thereof returning said pedal to its original position whereby the filled tubes will be successively emptied, one tube at a time.

4,169,420

ROOT FEEDER

Emmett S. Kresge, Sr., 21 Hathaway Ave., Enfield, Conn. 06082

Filed Jun. 27, 1978, Ser. No. 919,620
Int. Cl.[2] A01G *29/00*
U.S. Cl. 111—7.1 **2 Claims**



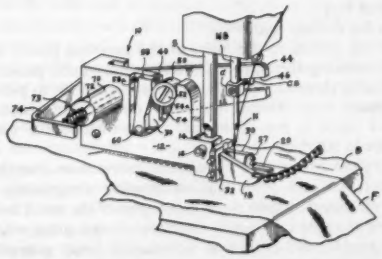
1. A root feeder comprising, a housing having interconnected curved upper and lower walls defining a cylindrical mixing chamber with closed ends, an inlet for charging fertilizer into the mixing chamber, a water inlet in one end connected to a source of water for charging water into the mixing chamber, a valve having a restricted through passage in the water inlet, and a plurality of tubular tines communicating with the mixing chamber and extending outwardly from the lower wall of the housing, the tines having outlet ports at one end thereof and having opposite open ends extending into the mixing chamber, the open ends of the tines being flat and disposed in contact with the curved upper wall of the housing to define a restricted opening above each tine for insuring a thorough mixing of the water and fertilizer through a churning action and constant feeding of the mixture in a sucking action into the open ends of the tines.

4,169,421

APPARATUS FOR AFFIXING SLIDE FASTENER ELEMENTS TO FABRIC

Jonathan A. Foults, deceased, late of Wolcott, Conn. (by Patricia L. Foults, executrix), assignor to Scovill Manufacturing Company, Waterbury, Conn.

Continuation of Ser. No. 778,742, Mar. 17, 1977, abandoned. This application Jun. 3, 1978, Ser. No. 921,745
Int. Cl.[2] D05B *97/10, 37/06*
U.S. Cl. 112—104 **9 Claims**



1. An apparatus for affixing a line of zipper fastener elements to the material of a garment or the like, the line of zipper elements comprising a plurality of "U"-shaped plastic elements each having at its bight an enlarged head and a pair of parallel legs, the elements being held in spaced aligned relation by a pair of cords bonded in the respective legs of each element, the apparatus comprising a sewing machine, means for holding the line with the "U"-shaped elements with their heads down against the fabric so that the needle of the sewing machine can

pass over the successive legs and stitch them to the fabric, reciprocating blade means driven by the sewing machine for feeding the fabric and line step-by-step fashion through the sewing machine, engaging means selectively actuateable for deepening the reciprocation of the blade means to sever the line of fasteners.

4,169,422

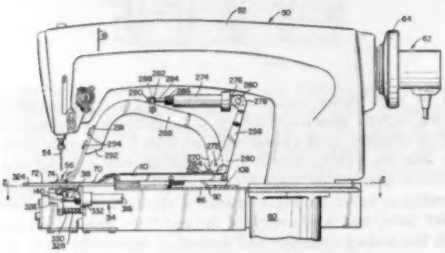
AUTOMATIC CHAIN-STITCH SEWING MACHINE

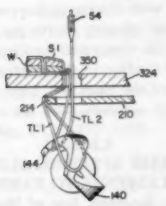
Robert A. Hayes, Franklin Park, and James A. Frendreis, Morton Grove, both of Ill., assignors to Union Special Corporation, Chicago, Ill.

Continuation of Ser. No. 671,882, Mar. 29, 1976, abandoned. This application Dec. 15, 1977, Ser. No. 861,075

Int. Cl.[2] D05B *21/00, 57/04*

U.S. Cl. 112—121.12 **9 Claims**





1. An automatic chain-stitch sewing machine for forming an improved stitch pattern in a work piece, comprising:

a sewing needle;

a work holder for retaining the work piece during sewing and being movable in a plane relative the needle;

a rotary hook having a hook point for capturing a needle thread loop and drawing the loop through a previous thread loop;

means for driving said hook;

means for spreading the limbs of the previous thread loop and retaining them open while the rotary hook passes the captured thread loop through the spread limbs to prevent a missed stitch irrespective of the direction in which the work piece is moved in said plane relative the needle between stitches;

memory means having a plurality of instructions containing directional and positional information designating the direction and magnitude of movement of the work holder along separate coordinate directions in said plane relative the needle, said positional information being potentially variable to designate selected magnitudes of variable distance along both coordinate directions, and being capable of designating a fixed position of the work holder relative the needle between successive stitches along both coordinate directions, said memory means being capable of specifying simultaneous movement along both of said separate coordinate directions;

means for reading said instructions and for forming electrical signals representing the instructions; and

driving means responsive to said signals for moving the work holder in said plane relative the needle in the designated directions and magnitudes, said memory means including a plurality of instructions directing the work holder to form a pattern of chain-stitches in the work piece and a plurality of instructions at the end of the designated pattern directing the work holder to remain at a fixed position along both coordinate directions while reciprocating the needle through the work piece a plurality of times to form a knotted thread structure below the work piece extending from the pattern to prevent unravelling of the sewn pattern.

4,169,423

MARINE SHUNTER

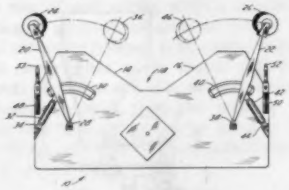
Norman V. Laskey, 264 Bromley Ave., St. Lambert, Chambly County, Quebec, Canada

Continuation of Ser. No. 711,364, Aug. 3, 1976, abandoned. This application Sep. 26, 1977, Ser. No. 836,764

Claims priority, application United Kingdom, Aug. 8, 1975, 33158/75

Int. Cl.[2] B63B *21/56*

U.S. Cl. 114—248 **12 Claims**



1. A shunter for use in maneuvering vessels in restricted waterways, the shunter comprising a body portion, a pair of clamping arms, said arms being pivotably connected proximate one end thereof to opposite sides of the body portion of the shunter with the opposed ends of said arms being adapted to engage opposed sides of the hull of the vessel to be maneuvered, means for moving said clamping arms into and out of a hull engaging relationship with said hull sides, said means being capable of exerting a substantial lateral force on each of the hull sides, drive means for powering the shunter, and means for interconnecting the shunter to the vessel to be maneuvered.

4,169,424

TENSION LEG BUOYANCY STRUCTURE

Maurice P. Newby, Helensburgh, and Roderick C. T. Rainey, Glasgow, both of Scotland, assignors to Yarrow and Company Limited, Glasgow, Scotland

Filed Aug. 16, 1976, Ser. No. 714,824

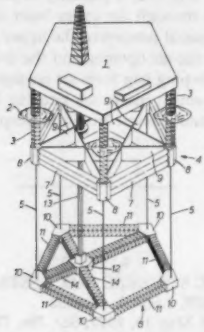
Claims priority, application United Kingdom, Aug. 14, 1975, 33982/75

Int. Cl.[2] B63B *35/44*

U.S. Cl. 114—265 **54 Claims**

1. A tension leg structure for use in seas exposed to wave action, said structure comprising a buoyancy section, an anchor section which rests on the sea bed, and a plurality of parallel tethers connecting said buoyancy section with said anchor section, said buoyancy section having a buoyant chamber substantially rectangular in plan and in elevation including one or more portions of that shape with the height of the buoyant chamber more than 2.5 times the width of the buoyant chamber and the height of each of the said portions of the buoyant chamber more than 2.5 times the width of each portion, said structure configured such that the natural period for linear oscillations in the direction of wave travel (τ_x), the

natural period for linear oscillations in the horizontal direction perpendicular to the direction of wave travel (τ_y) and the



natural period for rotational oscillations about the vertical axis of said structure (τ_θ) are each at least 50 seconds.

4,169,425

APPARATUS FOR REMOVING THE SURPLUS OF COATING COMPOUND IN PAPER COATING MACHINES

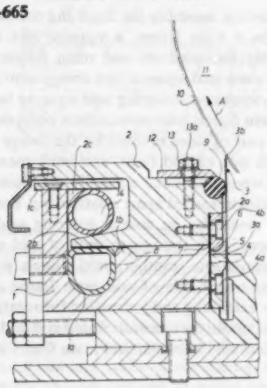
Albert Wohrle, Giengen, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

Filed Dec. 6, 1976, Ser. No. 747,775

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1975, 2555669

Int. Cl.[2] B05C *11/04*

U.S. Cl. 118—665 **36 Claims**



1. Apparatus for removing the surplus of coating composition from the coated side of a running web which consists of a paper or the like, comprising means for advancing the web along a predetermined path wherein the coated side of the web is exposed; a deformable doctor blade adjacent to the coated side of the web and extending substantially transversely of said path; means for adjusting the profile of said blade, including a profile determining element which is in direct contact with said blade and means for adjusting said element to thereby vary the profile of said blade; means for biasing said blade to a predetermined position with respect to the exposed side of the web in said path through the medium of said element, including a fixed support for said blade, a rigid member mounting said profile adjusting means, means for movably coupling said rigid member with said support for movement relative thereto, said rigid member extending substantially transversely of and being movable toward and away from said path, and means interposed between said support and said rigid member for urging said rigid member toward said path with a first force; means interposed between said support and said rigid member for urging said member away from said path with a second force so that said blade is biased to said predetermined position with a third force representing the difference between said first and second forces; and means for adjusting at least one of said urging means to thereby vary said third force so that the regulation of the thickness of the coating on the web can be regulated by adjusting said element independently of adjustment of said third force and/or by varying said third force.

4,169,426

APPARATUS FOR COATING A FILIFORM ELEMENT

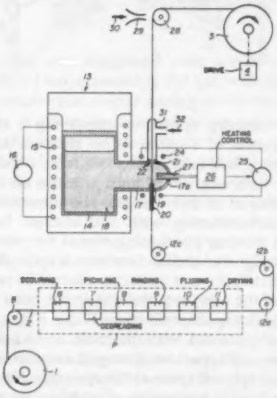
Michel Kornmann; Marcel Nussbaum, and Jürgen Rexer, all of Geneva, Switzerland, assignors to Battelle Memorial Institute, Carouge, Switzerland

Filed Jul. 19, 1977, Ser. No. 817,091

Claims priority, application Switzerland, Jul. 20, 1976, 9265/76

Int. Cl.[2] B05C *3/12*

U.S. Cl. 118—67 **5 Claims**



1. An apparatus for freeze-coating a filiform element with thermally fusible material, comprising:

a vessel provided with a lateral nozzle and adapted to be filled to a level above said nozzle with said thermally fusible material, said nozzle having a lower wall portion and an upper wall portion respectively provided with a tubular inlet and an annular outlet vertically aligned and coaxial with each other, said inlet having a diameter substantially equal to that of a filiform element to be coated, said outlet having a diameter ranging between substantially two and three times that of said inlet and being formed from a substance which is substantially nonwettable by said thermally fusible material;

said inlet comprising a tube adjustably seated in an aperture of said lower wall portion and long enough to reach said outlet in an elevated position;

an enclosure extending upwardly from said upper wall portion and forming a chamber aligned with said outlet, said chamber being connected to a source of protective gas under pressure;

heating means at said vessel and at said nozzle in the vicinity of said inlet and outlet for maintaining said thermally fusible material therein in a molten state;

feed means for axially advancing said filiform element in an upward direction by way of said inlet, outlet through said thermally fusible material and through said protective gas and enclosure; and

cooling means disposed above said enclosure in the path of said filiform element and comprising a deflecting member

engageable by said filiform element and a source of cooling fluid trained upon said member.

4,169,427

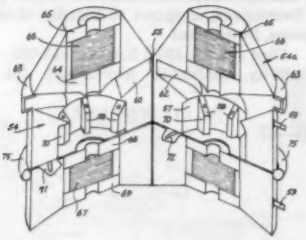
CABLE CLEANING UNIT

Desmond G. Crump, 147 Hale Rd., Wembley Downs, Western Australia; William G. Cornish, 176 Cobb St., Doubleview, Western Australia, and Hyem G. Same, 62 Lonsdale St., Yokine, Western Australia

Continuation of Ser. No. 676,974, Apr. 14, 1976, abandoned. This application Jan. 11, 1978, Ser. No. 868,715

Int. Cl.[2] B05B *1/04, 3/18*

U.S. Cl. 118—307 **5 Claims**



1. A cable cleaning apparatus employing a chamber surrounding a section of a cable to be cleaned, said chamber having a cleaning fluid inlet space, a plurality of nozzles within said space for directing jets of high pressure oil onto the surface of the cable at an acute angle, said apparatus including: means for communicating with said nozzles for supplying cleaning fluid thereto; positioning means for positioning said nozzles in a designated radial direction; a spin-off space adjacent to said inlet space and upstream thereof in relation to the entering side of the cable into the unit and in open communication with said inlet space, said spin-off space being adapted to receive oil and impurities from the cable, and a common outlet manifold from said apparatus arranged circumferentially in a side wall of said spin-off space at the upstream end thereof, said spin-off space having a plurality of turbo-vanes directing the oil and impurities to said common outlet manifold.

4,169,428

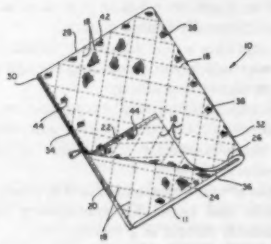
PET SLEEPING BAG

Dorothy C. Waugh, 6170 Weatherly Dr. NW., Atlanta, Ga. 30328

Filed Oct. 7, 1977, Ser. No. 840,390

Int. Cl.[2] A01K *1/02;* **A47G** *9/00;* **A01K** *13/00*

U.S. Cl. 119—1 **6 Claims**



6. A sleeping bag comprising a multiple ply padded sheet of deeply quilted material normally folded along its central portion with opposite halves in overlying relationship to form lower and upper layers and with the edge portions of each half in alignment with each other, closure means connecting the overlying edge portions of the layers of material together to form the sheet of material into an open-end bag-shape with an entry opening at one end, a plurality of air openings formed adjacent the fold through the upper layer of the sleeping bag away from the central portion of the upper layer of the sleeping bag whereby the air opening and the deeply quilted inside surfaces of the sleeping bag form air passages inside the sleeping bag and movement inside the sleeping bag usually causes air to enter into and exhaust from the sleeping bag.

4,169,429

HOG SQUEEZE BOX ASSEMBLY

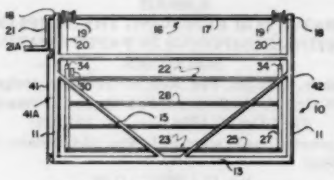
Alex Vass, Box 158, Lestock, Canada

Filed May 16, 1977, Ser. No. 797,052

Claims priority, application Canada, May 26, 1976, 253371

Int. Cl.[2] A61D *3/00*

U.S. Cl. 119—99 **11 Claims**



1. A squeeze box assembly for hogs and the like comprising in combination a main frame, a squeeze box component, a winch assembly mounted on said main frame, cable means extending between said squeeze box component and said main frame for elevating and lowering said squeeze box component within said main frame, said squeeze box component including a floor and a pair of sides pivoted by the lower edges thereof one upon each side of said floor, and latch means detachably extending between said sides normally maintaining the upper ends of said sides in spaced apart relationship, the displacement of said latch means by an animal entering said squeeze box component permitting the upper ends of said sides to swing inwardly towards one another, said winch assembly being situated on the upper side of said main frame and includes a longitudinally extending rod journalled for rotation within said main frame, a handle on one end of said rod and a spring scale detachably securable between said main frame and one end of said handle.

4,169,430

MODULAR HEAT EXCHANGERS WITH A COMMON FLUE

Harry A. Cheetham, 7 Water Tower Rd., Broadstone, Dorset, England

Filed Aug. 3, 1977, Ser. No. 821,579

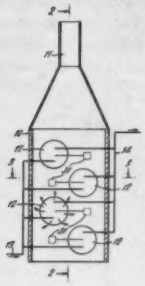
Claims priority, application United Kingdom, Aug. 12, 1976, 33535/76

Int. Cl.[2] F22B *31/04*

U.S. Cl. 122—25 **11 Claims**

1. A heat exchanger system comprising a plurality of separate individual modular heat exchanger units each having an inlet for fluid to be heated, an outlet for fluid heated in the unit and a burner, said units being connected in parallel between an

inflow conduit connected to each inlet and an outflow conduit connected to each outlet, said heat exchanger units being

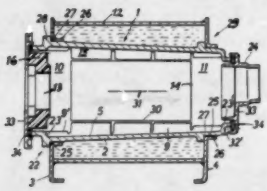


housed in a common duct constituting a flue for gaseous products of combustion from said units.

4,169,431
BOILER

Hans Viessmann, Im Hain, D3559 Battenberg, Eder, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 839,579, Oct. 5, 1977. This application May 15, 1978, Ser. No. 905,753
Claims priority, application Fed. Rep. of Germany, May 14, 1977, 2721893; May 14, 1977, 2645717
Int. Cl.[2] F22B *7/00*
U.S. Cl. 122—136 R **10 Claims**

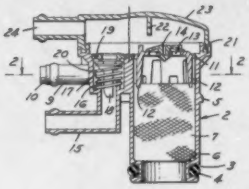


1. A boiler for heating water, comprising
(a) a casing for holding the water to be heated and including
(1) two end walls each defining apertures and
(2) a side wall extending between the end walls, the casing walls being of steel sheet, and
(b) a fire box unit inserted in the casing and including
(1) a tubular cast iron body mounted fluid-tightly in the apertures of the end walls of the casing, the cast iron body having an inlet end and an outlet end protruding beyond the end walls, being shaped to converge frustoconically from the inlet towards the outlet end, and having a plurality of radially inwardly extending webs distributed over the circumferences of the tubular body, and
(2) a combustion chamber shell mounted in the inlet end of the tubular cast iron body, the shell having a fuel burner inlet for burning a fuel in the combustion chamber defined by the shell, a closure wall opposite the fuel burner inlet whereby the combustion gases of the burnt fuel are deflected back towards the fuel burner inlet, a gas guide chamber at the fuel burner inlet for receiving the deflected gases, a gas collecting chamber adjacent the closure wall at the outlet end of the cast iron body, the shell with the gas guide and collecting chambers being supported on the radially inwardly extending webs of the cast iron body and defining therewith gas flues leading from the gas guide to the gas collecting chamber, the gases in the flues heating the water in the casing and condensate tending to form in a bottom region of the tubular cast iron body in the gas flues, and a shoulder damming the flow of the condensate in the bottom region of at least the protruding inlet end of the of tubular cast iron body.

4,169,432
INTEGRATED PCV VALVE AND OIL FILLER CAP

Leslie G. White, Hutton, England, assignor to Ford Motor Company, Dearborn, Mich.

Continuation of Ser. No. 783,506, Mar. 31, 1977, abandoned.
This application Jan. 26, 1979, Ser. No. 6,966
Int. Cl.[2] F01M *13/02*; F02M *25/06*
U.S. Cl. 123—41.86 **1 Claim**



1. An oil filler cap integrated with a positive crankcase ventilation (PCV) valve assembly for use with an automotive type internal combustion engine having an air cleaner assembly for the supply of clean air to a carburetor induction passage connected to the intake manifold of the engine, comprising:
a hollow-closed one-piece housing adapted to be inserted into the inlet of a tube projecting from the engine through which oil may be added to the engine and through which crankcase vapors from the engine may flow out of the engine into the housing, the housing having first means connecting the inlet tube to the engine intake manifold for the flow of crankcase vapors normally therebetween below a predetermined flow pressure level, the housing having second means connecting the air cleaner assembly to the engine crankcase for the flow of clean air to the crankcase at pressures higher than the intake manifold below the said predetermined flow pressure level, the housing having further means operable above the predetermined flow pressure level to connect the crankcase vapors to the air cleaner in parallel flow arrangement with the flow of vapors to the intake manifold, the first means including a cylindrical filter member open at opposite ends and adapted to have one end insertable into the inlet of the tube to receive crankcase vapors therefrom, the further means comprising a first one-way check valve closing the opposite end, first conduit means connecting the crankcase vapors through the filter member directly to the intake manifold at all times bypassing the check valve, the second means including a second conduit in side-by-side relationship to the filter member and a cover common to the filter member and second conduit and defining a chamber in the housing having a first connection to the filter through the first check valve end of the filter past the first check valve in an open condition, the chamber having a second connection to the crankcase through the second conduit past a second check valve comprising means including a spring closed valve means openable by pressure thereagainst in the chamber at a greater pressure level than in the crankcase, the chamber having additional conduit means connecting the chamber to the air cleaner assembly whereby flow of crankcase vapors below a first predetermined rate effects flow through the filter only into the intake manifold with the first check valve closed and the second check valve opened by the flow of air from the air cleaner to the crankcase and whereby flow of crankcase vapors above a predetermined rate effects opening of the first check valve for the simultaneous flow of vapors into the air cleaner

assembly as well as the intake manifold and the closing of the second check valve by the equalization of the pressure level of the vapors acting on opposite sides of the valve means.

4,169,433

ROTATIONAL MACHINE

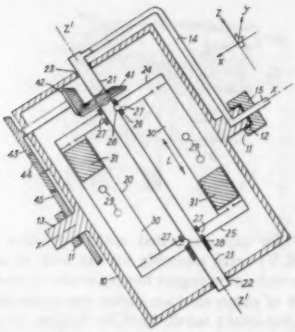
Timothy R. Crocker, Ridge Gate, Steep, Petersfield, England

Filed May 16, 1977, Ser. No. 797,262

Claims priority, application United Kingdom, May 19, 1976, 20669/76; Sep. 17, 1976, 38611/76

Int. Cl.[2] F02B *71/00*

U.S. Cl. 123—46 R **12 Claims**



1. Rotational machine for use in developing motive power from a motive pressure medium comprising

a shaft journalled for rotation,

a frame rotatably coupled to the shaft for rotation therewith,

a carrier rotatable in the frame about an axis transversely of the shaft,

at least one chamber in the carrier,

a piston arranged in the chamber to reciprocate in a direction transverse to the rotational axis of the frame,

means acting for transmission of rotation between the carrier and the frame,

and, means enabling the ported supply of motive pressure medium to reciprocate the piston,

wherein the relative dispositions of rotational axes of the frame and carrier and the path of the piston are such that reaction forces to inertial forces acting on the piston are translated to rotational forces producing a torque on the shaft,

whereby in use operation is in an engine mode in which by means of an externally supplied motive pressure medium the piston reciprocates and thereby drives the shaft.

4,169,434

INTERNAL COMBUSTION ENGINE WITH STEPPED PISTON SUPERCHARGER

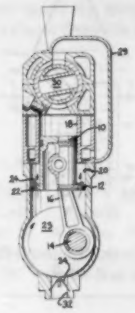
William D. Guenther, Hagerstown, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed May 13, 1977, Ser. No. 796,570

Int. Cl.[2] F01L *11/02*; F02B *33/12*; F01L *7/02*

U.S. Cl. 123—47 A **8 Claims**

1. In a four stroke internal combustion engine comprising a combustion chamber defined by a cylinder and an engine piston mounted for reciprocation within said cylinder, and a crankcase, said engine piston operating with separate and distinct exhaust, intake, compression and power strokes for each engine cycle, said exhaust and compression strokes occurring upon separate strokes of said engine piston in one direction and said intake and power strokes occurring upon separate strokes of said engine piston in another direction, the improvement comprising: a compressor having a compressor piston carried with said engine piston and a compressor cylinder sealingly receiving said compressor piston and forming therewith a compressor chamber; means for admitting a charge of air from said crankcase to said compressor chamber on each of said intake and power strokes of said piston; means for receiving said charge of air from said compressor chamber on each of said exhaust and compression strokes of said engine piston and



delivering two of said charges to said combustion chamber substantially during said intake stroke of each engine cycle; said compressor chamber having a volume greater than one-half the volume of said combustion chamber whereby said compressor provides a supercharger to deliver air to said combustion chamber at a higher pressure than said air is delivered to said supercharger.

4,169,435

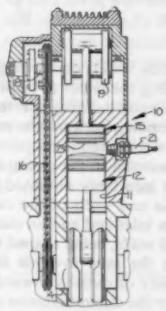
INTERNAL COMBUSTION ENGINE AND METHOD

Edward L. Faulconer, Jr., Rte. 4, Box 160, Greensboro, N.C. 27405

Filed Jun. 23, 1977, Ser. No. 809,187

Int. Cl.[2] F02B *75/04*

U.S. Cl. 123—48 A **18 Claims**



1. In an internal combustion engine having a cylinder, power piston means for defining with the cylinder a combustion chamber and reciprocable within the cylinder in a compression stroke and a combustion stroke, a crankshaft operatively connected with the power piston means for transmitting power therefrom during the combustion stroke, and control piston means for defining with the cylinder an intake chamber and for cooperating with the cylinder and the power piston means in defining the combustion chamber and operatively connected with the crankshaft for reciprocation in the cylinder in a transfer stroke and an intake stroke in timed relation with reciprocation of the power piston means, the improvement comprising means interconnecting said crankshaft and said control piston means for moving said control piston means with said power

piston means during a combustion stroke thereof and for maintaining said combustion chamber at substantially constant volume during said combustion stroke, exhaust means operatively communicating with said cylinder for venting gaseous products of combustion from said combustion chamber as said power piston means moves about a bottom dead center position, intake means operatively communicating with said cylinder for admitting gas into said intake chamber as said control piston means moves in the intake stroke, and transfer means in said control piston means for admitting gas from said intake chamber into said combustion chamber as said control piston means moves in the transfer stroke.

17. In a method of operating an internal combustion engine which comprises the steps of moving a control piston within a cylinder in an intake stroke and a transfer stroke between top dead center and bottom dead center positions while drawing a charge of gas into an intake chamber defined within the cylinder by the control piston and then transferring the charge through the control piston into a combustion chamber defined within the cylinder between the control piston and a power piston, moving the power piston in a compression stroke and a combustion stroke between top dead center and bottom dead center positions and in timed relation with movement of the control piston while compressing and burning the charge in the combustion chamber, and interconnecting the control and power pistons through a crankshaft while transmitting power from the engine by driving the crankshaft in rotation during a combustion stroke of the power piston, the improvement comprising maintaining the combustion chamber at substantially constant volume during the combustion stroke.

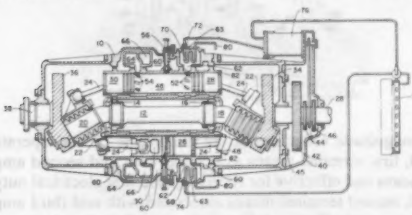
4,169,436
RECIPROCATING MACHINE WITH REFRIGERATED COOLING OF INTAKE AIR

Lewis W. Welch, Los Angeles, and Glenn E. Fish, Whittier, both of Calif., assignors to Welch Diesel Engine, Inc., Los Angeles, Calif.

Continuation of Ser. No. 625,434, Oct. 20, 1975, abandoned. This application Nov. 11, 1977, Ser. No. 850,572

Int. Cl.[2] F02B *29/04*

U.S. Cl. 123—58 BC **3 Claims**



1. A barrel-type reciprocating machine comprising:
- a block;
- a shaft journaled in said block including an oblique crank on each end thereof;
- a wobble spider mounted on each oblique crank;
- a plurality of cylinders in said block angularly spaced parallel to the axis of rotation of said shaft;
- a plurality of pistons reciprocally mounted in corresponding ones of said cylinders;
- a plurality of connecting rods linking said pistons to said wobble spiders;
- a plurality of intake ports in said cylinders;
- one or more semi-circular intake manifolds formed integrally with said block surrounding said cylinders and communicating with said intake ports;
- a plurality of coolant tubes formed in circuitous path and conforming to the semi-circular shape of said intake manifold, whereby the coolant coils are in close circumadjacent proximity to said intake ports; and
- means for circulating a coolant through said tubes, whereby air flowing through said manifold into said ports is cooled by said tubes.

4,169,437
SPEED CONTROL SYSTEM FOR A VEHICLE

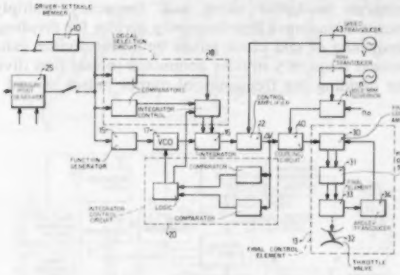
Helmut Fleischer, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 22, 1977, Ser. No. 853,927

Claims priority, application Fed. Rep. of Germany, Jan. 15, 1977, 2701567

Int. Cl.[2] B60K *31/00*

U.S. Cl. 123—102 **14 Claims**



1. A speed control system, especially for use in a vehicle powered by an internal combustion engine; said engine including power adjustment means and said system comprising:
- a final control element for engaging said power adjustment means;
- a control amplifier for actuating said final control element;
- an integrator for delivering an integrated set-point signal to said control amplifier;
- a function generator for generating a set-point control signal for said integrator;
- an arbitrarily settable member for selecting a desired engine speed and for providing an associated input datum to said function generator, said arbitrarily settable member having a mechanical pressure point indicator for providing a sensible pressure point and wherein the position of said member at one side of said pressure point defines a decelerating region, whereas the position on the other side of said pressure point defines an accelerating condition and wherein the position in the vicinity of said mechanical pressure point defines constant engine speed.

4,169,438
ELECTRONIC IGNITION TIMING CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE

Kazuo Iwase, and Ritsu Katsuoka, both of Okazaki, Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Oct. 17, 1977, Ser. No. 842,885

Claims priority, application Japan, Nov. 6, 1976, 51-133321

Int. Cl.[2] F02P *5/08, 5/04*

U.S. Cl. 123—117 D **3 Claims**

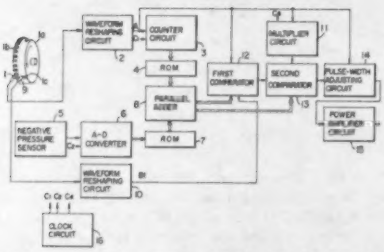
1. In an ignition timing control system for an internal combustion engine:
- rotation detecting means, operatively coupled to said engine, for generating a rotation pulse each time said engine produces a rotation of a predetermined angle;
- reference position detecting means, operatively coupled to said engine, for generating a reference position signal each time said engine rotation reaches a rotational reference position;
- means for generating clock pulses of a fixed frequency;
- retard angle setting means connected to said rotation detecting means and said clock pulse generating means, for

producing a digital signal representing an ignition retard angle from said rotational reference position, in accordance with operating conditions of said engine including engine rotational speed; and

ignition time control means connected to said retard angle setting means, said rotation detecting means and said reference position detecting means, for counting, responsive to the reference position signal, the rotation pulses so as to produce an ignition timing signal when the counted value thereof reaches the digital signal produced in said retard angle setting means;

the improvement comprising:

frequency multiplying means connected to said clock pulse generating means, and connected between said rotation detecting means and said retard angle setting means, for multiplying the frequency of said rotation pulses by a constant multiplier value, said frequency multiplying means including: a first frequency divider for dividing the frequency of said clock pulses by a first divisor value; a second frequency divider connected to said first divider, for dividing the frequency of output pulses of said first



divider by a second divisor value which is equal to said constant multiplier value; a first counter connected to said second frequency divider, for counting output pulses of said second frequency divider during a period of said rotation pulse and changing the first divisor value of said first frequency divider each time the number of the output pulses applied from said second frequency divider reaches a predetermined value; latch means connected to said first counter, for memorizing the count value of said first counter at the end of the period of said rotation pulse; a third frequency divider for dividing the frequency of said clock pulses by a third divisor value; and a second counter connected to said latch means and said third frequency divider, for counting output pulses of said third frequency divider and changing said third divisor value of said third frequency divider each time the number of the output pulses applied from said third frequency divider reaches a value equal to said predetermined value of said first counter, said second counter producing an output pulse to reset itself each time the count value thereof reaches the value memorized in said latch means.

4,169,439

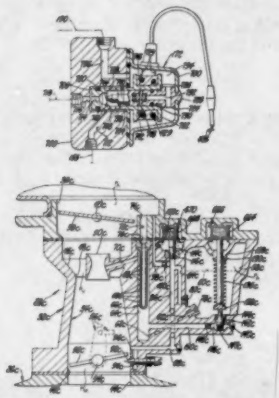
CIRCUIT MEANS AND APPARATUS FOR CONTROLLING THE AIR-FUEL RATIO SUPPLIED TO A COMBUSTION ENGINE

Chong L. Tsiang, Utica, and Kenneth C. Bier, Bloomfield Hills, both of Mich., assignors to Colt Industries Operating Corp., New York, N.Y.

Filed Mar. 21, 1977, Ser. No. 768,053
Int. Cl.[2] F02B *33/00*
U.S. Cl. 123—119 EC **45 Claims**

1. A carburetor for a combustion engine, comprising induction passage means for supplying motive fluid to said engine, a source of fuel, main fuel metering system means communicating generally between said source of fuel and said induction passage means, idle fuel metering system means communicating generally between said source of fuel and said induction passage means, selectively controlled modulating valving means effective to controllably alter the rate of metered fuel flow through each of said main fuel metering system means and said idle fuel metering system means, and electrical circuit means effective for sensing the oxygen content within the exhaust gases of said engine and in response thereto controlling said valving means, said electrical circuit means comprising oxygen sensor means effective for sensing the relative amount of said oxygen in said exhaust gases and producing in response thereto an electrical output signal, means for comparing said output signal to a preselected reference value, amplifier means for amplifying any difference as between said preselected value and said output signal and for producing an electrical control signal effective for controlling said modulating valving means, said amplifier means comprising lag and attenuation circuit means effective for stabilizing fluctuations occurring in said output signal.

37. An electrical circuit for controlling the energization of first and second solenoid coils in response to an electrical operating signal of variable magnitude, comprising first, second, third, fourth and fifth operational amplifier means, first and second transistor means comprising first Darlington circuit means, third and fourth transistor means comprising second Darlington circuit means, first and second voltage divider means, said first amplifier means being effective to receive said operating signal and to produce a first electrical output signal



of a magnitude reflective of the magnitude of said operating signal, first terminal means associated with said second amplifier means and effective for receiving said first electrical output signal, second terminal means associated with said third amplifier means and effective for receiving said first electrical output signal, third terminal means associated with said second amplifier means and effectively connected to said first voltage divider means as to thereby establish a first reference magnitude for said second amplifier means, fourth terminal means associated with said third amplifier means and effectively connected to said second voltage divider means as to thereby establish a second reference magnitude for said second amplifier means, fifth terminal means associated with said second amplifier means for producing a first amplified output signal indicative of the difference in magnitudes between said first electrical output signal and said first reference magnitude, sixth terminal means associated with said fourth amplifier means and effective to receive said first amplified output signal, seventh terminal means associated with said fourth amplifier means for producing a second output signal, first base electrode means associated with said first Darlington circuit means for receiving said second output signal and in response thereto causing an output collector-emitter of said first Darlington circuit means to energize said first solenoid coil through first conductor means, eighth terminal means associated with said fourth

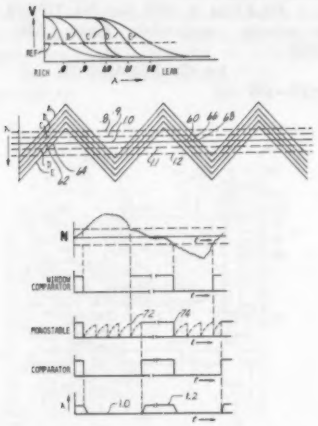
amplifier means and electrically connected to said first conductor means, nineth terminal means associated with said third amplifier means for producing a second amplified output signal indicative of the difference in magnitudes between said first electrical output signal and said second reference magnitude, tenth terminal means associated with said fifth amplifier means and effective to receive said second amplified output signal, eleventh terminal means associated with said fifth amplifier means for producing a third output signal, second base electrode means associated with said second Darlington circuit means for receiving said third output signal and in response thereto causing an output collector-emitter of said second Darlington to energize said second solenoid coil through second conductor means, twelveth terminal means associated with said fifth amplifier means and electrically connected to said second conductor means, and attentuating circuit means associated with each of said second and third operational amplifier means effective to cause said first and second amplified output signals to be attenuated with respect to said differences, respectively.

4,169,440

CRUISE ECONOMY SYSTEM

Lael B. Taplin, Bloomfield Hills, and James D. Bode, Royal Oak, both of Mich., assignors to The Bendix Corporation, Southfield, Mich.

Filed Dec. 1, 1977, Ser. No. 856,452
Int. Cl.[2] F02D *5/00*
U.S. Cl. 123—119 EC **28 Claims**



1. A method of air/fuel ratio management for an internal combustion engine comprising:

providing an exhaust gas sensor in the exhaust system of said internal combustion engine which is operable to generate a waveform dependent upon the constituent composition of said exhaust gas;

controllably generating a modification signal input to said exhaust sensor, said sensor changing the generated waveform in response to the modification signal and as a function of the modification signal; and

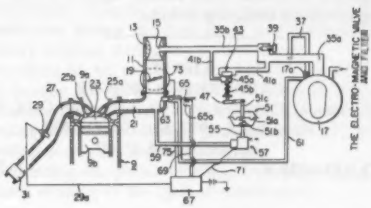
regulating said air/fuel ratio of the internal combustion engine with the modified waveform generated by said exhaust gas sensor such that the air/fuel ratio will be controlled by the modification signal.

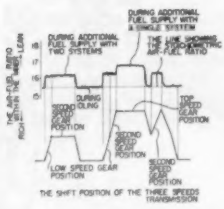
4,169,441

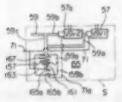
ARRANGEMENT FOR CONTROLLING AN AIR-FUEL RATIO OF AN AIR-FUEL MIXTURE OF AN INTERNAL COMBUSTION ENGINE

Tadayoshi Hirano, and Michio Kawagoe, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Sep. 19, 1977, Ser. No. 834,553
Claims priority, application Japan, Mar. 30, 1977, 52/34743
Int. Cl.[2] F02B *33/00*
U.S. Cl. 123—119 EC **13 Claims**







1. An arrangement for controlling an air-fuel ratio of an air-fuel mixture in accordance with changes in an operating condition of an internal combustion engine which is provided with a catalytic converter in the exhaust system, prior to distributing the air-fuel mixture into combustion chambers to the engine through an intake system comprising:

an initial stage mixing means for mixing in said intake system intake air with fuel supplied from a fuel source through a first fuel passage;

an adjustable screw means for adjustably restricting the amount of the fuel flowing through said first fuel passage, so that an initial stage air-fuel mixture mixed by said first stage mixing means is leaner than the stoichiometric air-fuel ratio;

a second fuel passage connecting said fuel source with an additional fuel supply nozzle element capable of supplying a predetermined amount of an additional fuel into said intake system, thereby enriching said initial stage air-fuel mixture toward the stoichiometric air-fuel mixture ratio;

a first valve means capable of operating to open said additional fuel supply nozzle element upon being energized;

sensing means for sensing a change in the air-fuel ratio of an air-fuel mixture supplied into the combustion chambers of the internal combustion engine and for delivering an electric control signal corresponding to sensed air-fuel ratio changes;

electric control means responsive to said electric control signal for energizing said first valve means;

means for detecting a change in the operating condition of the internal combustion engine and delivering a different control signal corresponding to the detected change to said electric control means;

a third fuel passage for supplying an enriching fuel from said fuel source into said initial stage mixing means separately from said first fuel passage to enrich said initial stage air-fuel mixture until an air-fuel ratio thereof is closer to the stoichiometric air-fuel ratio;

a second valve means disposed in said third fuel passage for producing a fluid communication between said fuel source and said initial stage mixing means through said third fuel passage upon being actuated, and;

actuating means for actuating said second valve means in response to a signal from said electric control means responsive to said different control signal from said operating condition detecting means.

4,169,442

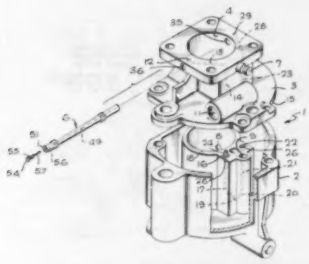
CARBURETOR DE-ICER

Gust S. Fossum, 42052 3rd St. East, Lancaster, Calif. 93534

Filed Jul. 5, 1977, Ser. No. 812,603

Int. Cl.[2] F02M *31/00*

U.S. Cl. 123—122 A **7 Claims**



1. An engine having an oil lubrication system and a carburetor provided with a body having a throat therethrough and a fuel jet communicating with said throat at a point where air and fuel mixing may occur, and an apparatus for preventing carburetor icing comprising:

an entrance port at a first exterior location on said body;

an exit port at a second exterior location on said body, said entrance and exit ports being disposed at spaced apart locations at the top of said body;

means defining a first passage branch within said body extending downwardly from said entrance port to a point at or below the location where said fuel extends into said throat; and,

means defining a second passage branch in communication with the end of said first passage branch defining means opposite said entrance port, and extending upwardly therefrom to said exit port, for conducting oil from said engine oil lubricating system therethrough and thereby heat said fuel jet.

4,169,443

CONTROL DEVICES

Eugenio Todeschini, Latina, Italy, assignor to Massey-Ferguson Service, N.V., Curacao, Netherlands

Filed Oct. 14, 1977, Ser. No. 842,423

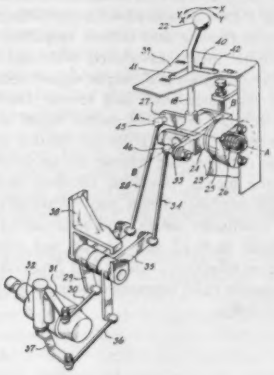
Claims priority, application United Kingdom, Oct. 14, 1976, 42634/76

Int. Cl.[2] F02M *39/00*; G05G *9/02*

U.S. Cl. 123—139 R **3 Claims**

1. A prime mover assembly comprising a prime mover and a control therefor, said control having a lever movable in a first plane to vary the rotational speed of said prime mover and movable in a second plane to stop said prime mover, and wherein guide means are provided to guide said lever in said first plane and to permit movement in said second plane only when said lever is in a position corresponding to a minimum rotational speed.

3. An assembly according to claim 1 in which the lever carries a first actuating arm connected to one of said speed and



stop controls by a linkage including a ball joint whose centre lies on said further axis, and the pivotting block carries a second actuating arm connected to the other of said speed and stop controls by a further linkage including a further ball joint whose centre lies on said one axis.

4,169,444

FUEL INJECTION APPARATUS

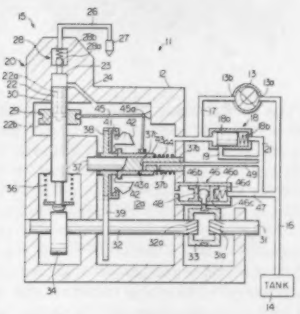
Nobuhiro Kaibara; Yasutaka Yuzawa, and Masayoshi Kobayashi, all of Matsuyama, Japan, assignors to Diesel Kiki Company, Ltd., Tokyo, Japan

Filed Mar. 8, 1977, Ser. No. 775,579

Claims priority, application Japan, Mar. 13, 1976, 51/30247[U]

Int. Cl.[2] F02M *39/00*

U.S. Cl. 123—139 AQ **7 Claims**



1. A fuel injection apparatus comprising:

fuel injector means;

a rotary input member;

fuel injector control means connected between the input member and the fuel injector means for controlling a fuel injection volume in accordance with a rotational speed of the input member;

a fuel supply pump for supplying fuel to the fuel injector means;

fuel injection timing means connected to the fuel injector means for controlling a fuel injection timing in accordance with a pressure of fuel supplied to the fuel injector means from the fuel supply pump;

modulator valve means connected to the fuel injector control means and the fuel supply pump for modulating said pressure in accordance with said rotational speed of the input member;

the modulator valve means being constructed to maintain said timing at a predetermined value as said rotational speed is progressively increased from zero to a predetermined speed, and to retard said timing below said predetermined value and subsequently to advance said timing above said predetermined value as said rotational speed is progressively increased above said predetermined speed; and

a fuel reservoir communicating with an inlet of the fuel supply pump, an outlet of the fuel supply pump being connected to the fuel injector means, the modulator valve means controlling communication between the outlet of the fuel supply pump and the fuel reservoir;

the modulator valve means comprising a first member formed with a passageway having at least one orifice, the passageway communicating with the fuel reservoir, said at least one orifice being communicable with the outlet of the fuel supply pump, the modulator valve means further comprising a second member movable relative to the first member for blocking and unblocking said at least one orifice, the fuel injector control means positioning the second member relative to the first member;

the first member being formed with two orifices, the second member being constructed to unblock the first orifice while blocking the second orifice, subsequently unblock both the first orifice and the second orifice and subsequently block both the first orifice and the second orifice as said rotational speed of the input member is progressively increased from zero.

4,169,445

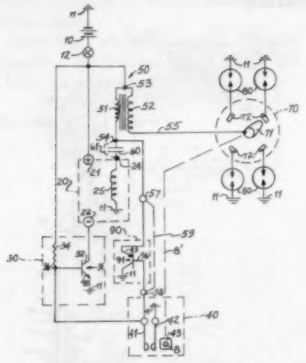
TRANSIENT INTERMODULATION IGNITION SYSTEM

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Continuation-in-part of Ser. No. 868,118, Jan. 9, 1978. This application Feb. 17, 1978, Ser. No. 878,792

Int. Cl.[2] F02P *3/06;* **H05B** *41/36*

U.S. Cl. 123—148 AC **11 Claims**



1. A transient modulation ignition system, including a transformer with a primary winding, said system having a first and a second mode of operation, comprising the combination of:

timing means electrically coupled to the primary winding for charging said primary winding during the first mode and for discharging said primary winding during the second mode;

AC means for generating AC power during the second mode, said AC means having an output terminal, said output terminal being electrically coupled to the primary winding;

a capacitor connected between said primary winding and output terminal, the discharge from the primary winding through the capacitor producing transient power; and

switching means, connected to the AC means and coupled to the timing means, for inhibiting DC power from energizing the AC means during the first mode and for enabling DC power to be fed to the AC means during the second mode thereby activating the AC means so as to produce said AC power which intermodulates with the transient power in said primary winding.

8. A method for providing ignition power by AC modulation of transient power in a system having first and second modes of operation, comprising in combination the steps of:

(a) electrically charging a primary winding of an ignition transformer during the first mode and discharging said primary winding during the second mode;

(b) activating an AC power source during the second mode and thereby providing transient power output therefrom;

(c) intermodulating power discharged from the primary winding with the transient power fed to said primary winding during the second mode; and

(d) transferring the power resulting from step (c) to a secondary winding of the ignition transformer.

4,169,446

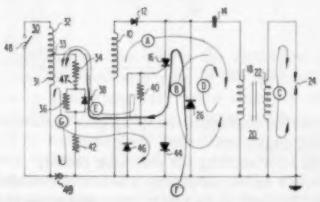
CDI METHOD AND SYSTEM WITH IN PHASE COILS

Robert V. Jackson, Los Angeles, Calif., and Harold F. Anderson, deceased, late of Squaw Valley, Calif., assignors to McCulloch Corporation, Los Angeles, Calif.

Filed Sep. 22, 1975, Ser. No. 615,514

Int. Cl.[2] F02P *1/00*

U.S. Cl. 123—148 CC **25 Claims**



1. A capacitor discharge ignition circuit including:

a capacitor;

charging coil means for charging said capacitor;

a high voltage transformer;

a trigger coil;

an SCR for discharging said capacitor through said transformer in response to said trigger coil; and,

circuit means including a gate to cathode impedance for varying the gating sensitivity of said electronic switch, including a circuit component for varying the degree of periodic back bias on said SCR, and including a second circuit component for varying the gating current of said SCR, the variation of each of said impedance and said first and second circuit components providing substantially no variation in the response of the others thereof.

4,169,447

STARTING SYSTEM FOR COMPRESSION IGNITION ENGINE

Roy G. R. Furzer, Willowdale, Canada, assignor to Diesel Equipment Ltd., Toronto, Canada

Filed Aug. 8, 1977, Ser. No. 822,554

Int. Cl.[2] F02N *17/00*

U.S. Cl. 123—179 E **5 Claims**

1. A starting system for an internal combustion engine of the compression ignition type, the system comprising

a cranking motor having a main shaft, said main shaft providing first and second shaft extensions extending coaxially with one another from opposite ends of the motor,

a pinion carried by the first shaft extension and engageable with a starter gear of the engine for starting the engine,

a drive gear carried by the second extension and rotatable therewith,

a sun gear carried by the second shaft extension and rotatable therewith,

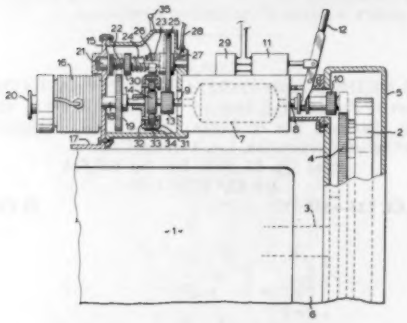
an auxiliary engine having a crankshaft and a starter gear thereon, and

first and second transmission means connected between the crankshaft of the auxiliary engine and the main shaft of the cranking motor for starting the auxiliary engine from the cranking motor and for driving said main shaft of the cranking motor from the auxiliary engine, respectively,

said first transmission means comprising

(i) a layshaft having a sprag mounted thereon and connected to the layshaft by a cushion spring,

(ii) a sprag gear in constant sliding mesh with said drive gear, the sprag gear being engageable with the sprag and being normally biassed out of engagement therewith,



(iii) means for displacing the sprag gear against its bias into driving engagement with the sprag,

(iv) means for starting the cranking motor,

(v) a Bendix drive comprising a helically threaded portion of said layshaft and a pinion rotatably mounted thereon, said pinion being axially displaceable in response to rotation of the layshaft into meshing engagement with the starter gear of the auxiliary engine, and being disengageable therefrom in response to reverse rotation of the layshaft upon starting of the auxiliary engine, and

said second transmission means comprising

(i) an epicyclic gear train engageable with said sun gear the epicyclic gear train being carried by a planet carrier rotatable with the crankshaft of the auxiliary engine, and

(ii) a clutch selectively engageable with said epicyclic gear train for coupling and uncoupling said crankshaft of the auxiliary engine to and from the second shaft extension of the cranking motor.

4,169,448

AIR HEATER SYSTEM

Peter C. Hodge, and William S. May, both of High Wycombe, England, assignors to Lucas Industries Limited, Birmingham, England

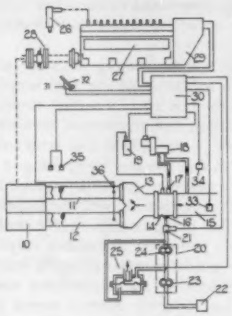
Continuation-in-part of Ser. No. 713,912, Aug. 12, 1976, abandoned. This application Jul. 14, 1978, Ser. No. 924,671

Claims priority, application United Kingdom, Jun. 22, 1976, 25823/76

Int. Cl.[2] **F02M** *31/00;* **F04B** *3/00*

U.S. Cl. 123—179 H **18 Claims**

1. An air heater system for a compression ignition engine comprising in combination a combustion chamber including a burner through which fuel is supplied to the combustion chamber, a two stage fuel pump for supplying fuel to the burner, each stage of the pump being of the fixed displacement type and having an inlet and an outlet, passage means through which the outlet of the second stage is connected to the burner and further passage means through which the input of the second stage is connected to the outlet of the first stage the input of which is, in use, connected to a source of fuel, the rate of fuel delivery of said pump being dependent upon the speed at which the pump is driven, first motor means for driving said



pump, valve means including a valve element responsive to the inlet and outlet pressures of the second stage of the pump for controlling the size of a spill port connected to said further passage means, said valve means being operable to use to spill fuel through said spill port so that there is substantially no pressure drop across the second stage of the pump, said first stage of the pump being arranged to pump more fuel than the second stage and control means for controlling the speed of operation of the pump.

4,169,449

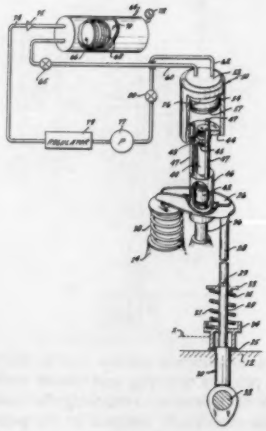
CYLINDER DE-ACTIVATOR SYSTEM

Horace T. Brock, Jr., Box 238, Ehrenberg, Ariz. 85334

Filed Nov. 7, 1977, Ser. No. 848,937

Int. Cl.[2] **F02D** *13/06*

U.S. Cl. 123—198 F **6 Claims**



1. A cylinder de-activator system for an internal combustion engine comprising:

a block and an engine head,

a plurality of engine cylinders in said block, intake and exhaust valves for each engine cylinder spring loaded to their closed positions,

a cam operated valve train operating each said valve, said

valve train comprising a rocker lever that has an aperture in its midsection that allows the rocker lever to be rockingly connected to a first mounting stud extending upwardly from said engine head, one end of said rocker lever presses against a coil spring that normally keeps said valve closed and the other end of said rocker lever receives the top of a push rod,

hydraulic means for varying the fulcrum position on said first mounting studs about which said rocker lever rocks, said hydraulic means comprising

a tubular sleeve having said first mounting stud extending upwardly within, the top of said tubular sleeve having a pressure force transfer surface,

a hydraulic cylinder having integral lateral walls that stretch continuously all the way from the bottom of said hydraulic cylinder to its top, the hydraulic cylinder has a top wall that closes that end of the cylinder, a piston is reciprocally mounted within said hydraulic cylinder and it forms a sealed chamber between its top surface and the interior of said hydraulic cylinder, the hydraulic cylinder has a bottom wall that closes that end of the cylinder, said bottom wall having a plurality of bores passing through it into which a plurality of force transfer pins are inserted, the lower end of said pins are supported on the force transfer surface of said tubular sleeve with the top ends of said pins forming pressure contact surfaces against which said piston is forced when hydraulic fluid under pressure enters said sealed chamber in the hydraulic cylinder to activate the valve for re-activating that cylinder of the engine.

a fluid pressure system having a source of hydraulic fluid under pressure connected to the sealed chamber in said hydraulic cylinder by at least one tube and control valves in the fluid pressure system to control the hydraulic force exerted against the top of the piston in said hydraulic cylinder.

4,169,450

INTERNAL COMBUSTION ENGINE FOR AN AUTOMOBILE PROVIDED WITH AN AIR-CONDITIONER

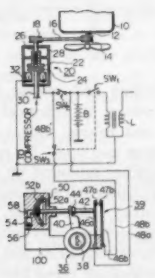
Masaru Tanaka; Kazuyoshi Tasaka, and Tetuo Tanigawa, all of Toyota, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Mar. 18, 1977, Ser. No. 779,054

Claims priority, application Japan, Dec. 22, 1976, 51-170825[U]; Dec. 22, 1976, 51-170826[U]

Int. Cl.[2] F02B *77/00*

U.S. Cl. 123—198 D **5 Claims**



1. In an internal combustion engine for an automobile provided with an ignition switch, an air conditioner having a compressor and an electro-magnetic clutch mechanism capable of mechanically connecting a crankshaft of said engine with said compressor when air conditioning is required during the operation of said engine in which the ignition switch of the engine is closed, the improvement comprising switch means to retard the "dieseling" phenomenon, said switch means being electrically connected to the clutch mechanism and cooperating with the ignition switch in such a manner that the switch means is open when the ignition switch is in its ON position, is closed when the ignition switch is switched to its OFF position for actuating the electro-magnetic clutch mechanism to engage it so that the rotation of the engine is braked due to the load of the compressor for preventing "dieseling" from occurring, and is opened after a short period of time has elapsed after the switching of the ignition switch to its OFF position for deactuating the clutch mechanism.

4,169,451

ROTARY PISTON INTERNAL COMBUSTION ENGINE AND METHOD FOR INFLUENCING ITS OPERATION

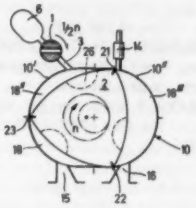
Gerd G. Niggemeyer, Nibelungenstrasse 8, 6200 Wiesbaden, Fed. Rep. of Germany

Filed Apr. 4, 1978, Ser. No. 893,334

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1977, 2715302

Int. Cl.[2] F02B *53/02*

U.S. Cl. 123—202 **31 Claims**



1. In a method for controlling the operation of a rotary piston internal combustion engine of the type having a two-curve housing and triangular piston rotor, in which such method includes dividing the compressed medium into a main volume and an auxiliary volume during a compression stroke, the auxiliary volume thereafter being dissipated by the piston rotor, and temporarily storing a part of the compressed medium during said compression stroke, by entrapping such part with said auxiliary volume during said division, and thereafter during the next following compression stroke adding the said temporarily stored part of said compressed medium to the medium then to be compressed, wherein the improvement comprises, for Diesel operation of the internal combustion engine, carrying out said adding of the temporarily stored medium in the final phase of said next following compression stroke to the thereby compressed medium.

4,169,452

FUEL INJECTION ROTARY PISTON INTERNAL COMBUSTION ENGINE OF THE TROCHOIDAL TYPE

Johannes Steinwart, Obersulm-Willsbach, and Peter Will, Bad Rappenau, both of Fed. Rep. of Germany, assignors to Audi Nsu Auto Union Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 22, 1977, Ser. No. 835,492

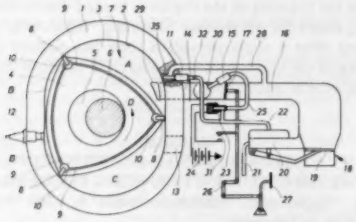
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1976, 2642487

Int. Cl.[2] F02B *53/10*

U.S. Cl. 123—206 **5 Claims**

1. A fuel injection rotary piston internal combustion engine of the trochoidal type with a housing made up of a peripheral portion and two side walls and with a first injection nozzle in the peripheral portion an inlet passage being provided in each of the side walls and a second injection nozzle mounted in one of the inlet passages, whilst the other inlet passage carries only air, the nozzles being connected to a fuel delivery device and being of variable injection delivery, the first nozzle being mounted at a point in the peripheral portion which lies in the working chamber that is undergoing the induction phase and

being in the form of an air-shielded nozzle of which the shielding air opening being so constructed and arranged to provide a cross-section corresponding to at least a major part of the



idling air requirements, and a continuous injection fuel delivery means for feeding a quantity of fuel proportional to the quantity of air drawing in, and connected to the first injection nozzle and the second nozzle.

4,169,453

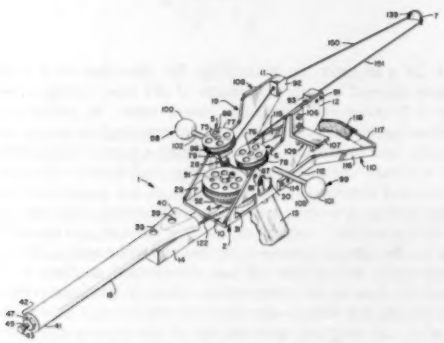
COMPOUND SLINGSHOT

Glen G. Hunsicker, Topeka, Kans., assignor to Dory J. Neale, Sr., Topeka, Kans., a part interest

Filed Oct. 3, 1977, Ser. No. 839,013

Int. Cl.[2] F41B *3/00*

U.S. Cl. 124—20 R **10 Claims**



1. An apparatus for hurling projectiles, said apparatus comprising:

(a) a longitudinally extending support, being rigid, and adapted for holding by a user;

(b) elongate energy storage means being longitudinally resilient, and having first and second ends; the first end of said energy storage means being connected with said support;

(c) a cam rotatably mounted on said support; said cam being operatively connected with the second end of said energy storage means whereby selected cam rotation elongates and tenses said energy storage means;

(d) a projectile receiver operatively connected with said cam whereby rearward translation of said receiver, substantially parallel to the longitudinal axis of the support, with respect to said support rotates said cam and applies tension to said energy storage means such that the force required to retain said receiver at a fully extended position is less than the force required to retain said receiver at an intermediate position; and

(e) mechanical advantage means operably connected between said cam and said projectile receiver, whereby pulling force applied to said receiver is multiplied in the tension applied to said cam.

4,169,454

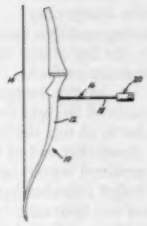
COMBINATION OF AN ARCHERY BOW, BOW STABILIZER AND ARROW HEAD EXTRACTOR

Lonnie M. Jones, 7678 Kress Dr., Klamath Falls, Oreg. 97601

Filed Feb. 23, 1978, Ser. No. 880,627

Int. Cl.[2] F41B *5/00*

U.S. Cl. 124—23 R **3 Claims**



1. The combination with a stabilizer equipped bow of an arrow having a shaft and a separable head, the bow stabilizer including a shaft detachably connected to the bow and a head detachably connected to the stabilizer shaft, the stabilizer head being interchangeably connectible to the stabilizer shaft and to the arrow head, and the stabilizer head being formed with a cross-bore through which the stabilizer shaft, when detached from the bow, may be inserted for extracting the arrow head from an unintended target.

4,169,455

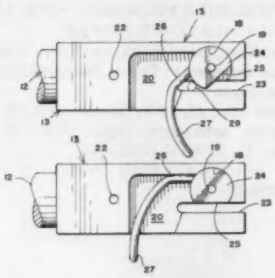
BOWSTRING RELEASE DEVICE

Hugh R. Wilson, 10840 SW. 120th St., Miami, Fla. 33176

Filed Apr. 10, 1978, Ser. No. 894,823

Int. Cl.[2] F41C *19/00*

U.S. Cl. 124—35 A **4 Claims**



1. A bowstring holding and release device comprising a holding and release means for releaseably engaging a bowstring, said holding and release means comprising a body, notch means mounted on said body, for receiving a bowstring, a rotating holding member mounted on said body for movement between a first position and a second position for holding and releasing a bowstring, respectively, a portion of the periphery of said holding member intersecting said notch means for holding a tensed bowstring when said holding member is in a first position, said bowstring being held in said notch means by the outer peripheral surface of said portion, triggering means mounted on said holding member providing leverage for moving said holding member between said first and second positions, said triggering means and said holding member being so formed as to constitute a single moving part, escape means mounted on said holding member for releasing a bowstring when said holding member is moved from a first position to a second position, whereby when a tensed bowstring is held in said notch means by said portion of the periphery of said hold-

ing member when said holding member is in a first position said bowstring is releaseably held and when said holding member is moved from a first position to a second position said portion of the periphery of said holding member is withdrawn from said notch means releasing a tensed bowstring.

4,169,456

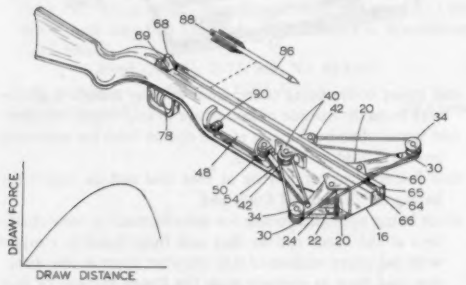
SHORT LIMB ARCHERY BOW

Robert M. Van House, 268 Enfield Rd., Dayton, Ohio 45459

Continuation-in-part of Ser. No. 598,569, Jul. 24, 1975, Pat. No. 4,041,927. This application Aug. 8, 1977, Ser. No. 822,682

Int. Cl.[2] F41B *5/00*

U.S. Cl. 124—61 **6 Claims**



6. An archery bow of the type having a stock provided with opposed side portions and having a latch member and a trigger member, the stock being provided with a portion adapted to support an arrow for launching thereof, the combination comprising:

a pair of limb members, there being one limb member pivotally supported at each of the side portions of the stock,

a pair of lever members, there being one lever member secured to each limb member for pivotal movement therewith,

a plurality of pulleys, there being a pulley rotatively supported by each limb member adjacent the end thereof, there being a pulley attached to the stock at each of the opposed side portions thereof,

a bow string in engagement with each of said pulleys and extending therebetween, said bow string being free of fixed attachment to any of said plurality of pulleys, said bow string further having a nock point positioned between those pulleys of said plurality of pulleys which are supported by the limb members,

motor means attached to the stock,

means joining the motor means to the lever members, the motor means having an operative condition and an inoperative condition, the motor means being normally in its inoperative condition, the nock point of the bow string being movable to the latch member for retaining the bow string in a full drawn position, movement of the nock point of the bow string to the latch member causing rotative movement of each of said pulleys and causing pivotal movement of the limb members and lever members and causing the motor means to change from its inoperative condition to its operative condition, the nock point of the bow string being adapted to receive an arrow positioned adjacent the latch member for launching thereof by the motor means with release of the bow string from the latch member.

4,169,457

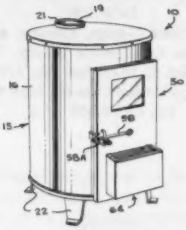
THERMOSTATICALLY REGULATED SPACE HEATERS FOR BURNING WOOD, COAL AND THE LIKE

Reuben L. Christophel, Harrisonburg, Va., assignor to Shenandoah Manufacturing Co., Inc., Harrisonburg, Va.

Continuation of Ser. No. 615,711, Sep. 22, 1975, abandoned. This application Jun. 23, 1977, Ser. No. 809,622

Int. Cl. F24b *3/00*

U.S. Cl. 126—65 **10 Claims**



1. A space heater for burning wood or coal fuel and the like, comprising a casing defining a vertically elongated heater enclosure including an outer sheet metal jacket forming vertically elongated outer side walls spanning the full height of the heater and forming a complete lateral surround about all side portions of the heater other than the door region thereof, flat top and bottom walls secured in air tight relation to the outer side walls, a grate assembly spanning the interior of the heater within the side walls at a horizontal location in the lower half of the interior of the casing spaced a predetermined distance above the bottom wall and dividing said interior into an ash chamber below the grate assembly and a fire chamber above the same, the casing having a single vertically elongated door and rectangular door frame therefor spanning the major portion of the height of the casing including the full height of the ash chamber and the major portion of the height of the fire chamber to provide access to both the ash chamber and the fire chamber, said door frame being formed of a pair of laterally spaced flat parallel vertical side frame plate members extending upwardly from the bottom wall a distance spanning the major portion of the height of the casing and including top and bottom flat horizontal frame plate members joined to the side frame plate members at the ends of the latter and joining said outer side walls along rectilinear vertical and horizontal juncture lines in outwardly extending relation therefrom with their outermost front edges lying in a single vertical plane defining a flat planiform door frame surface forming a single rectangle spaced outwardly from the path of the adjoining outer side wall portions of the casing, said door frame forming a rectangular lateral surround about the space framed thereby defining a single vertically elongated framed access passage extending through the adjacent side wall portion of the jacket and outwardly for a predetermined distance from the path of the latter and extending from immediately adjacent the bottom wall to a height considerably above the level of the grate assembly, means movably supporting said door on the door frame for movement between a closed position against the flat door frame surface in a plane spaced outwardly from the path of the adjacent side wall portion and movable to an open position and completely spanning the rectangular frame when in closed position, the single framed access passage including three inter-communicating zones spaced along the height thereof forming an upper fire chamber access zone above the level of the grate assembly spanning the major portion of the height of the fire chamber and a lower ash chamber access zone below the level of the grate assembly and an intermediate air communication zone therebetween occupying the space between the closed door and the periphery of the grate assembly when the door is closed for achieving free air flow communication between the upper and lower zone, the heater having a draft inlet opening horizontally aligned with the ash chamber for admit-

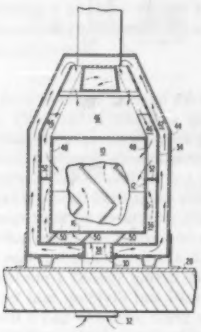
ting controlled amounts of primary and secondary air into the ash chamber and into the fire chamber through the intermediate air communication zone, and said outer side walls being inwardly lined with fire brick along the inner surface thereof over a zone extending upwardly from the grate assembly vertically spanning about half the height of the fire chamber over the maximum heat zone therein.

4,169,458

ZERO CLEARANCE FIREPLACE TYPE HEATING DEVICE

William S. Shaw, Prince George, Canada, assignor to Shaw's Modular Fireplaces, Ltd., Prince George, Canada

Filed Sep. 9, 1977, Ser. No. 831,823
Claims priority, application Canada, May 6, 1977, 277866
Int. Cl.[2] F24B *1/18*
U.S. Cl. 126—120 **6 Claims**



1. A zero clearance fireplace heating unit for heating a room comprising:

a firebox defined by heat conducting walls and a floor; a hood integral with the upper portion thereof, said hood in communication with a flue so that products of combustion in said firebox are collected in the hood and conveyed therethrough to the flue; the firebox having a front access opening and glass doors mounted thereon to cover said opening so that when said doors are closed air will not be admitted to said firebox through said opening;

first, second and third successive chambers defined by mutually spaced heat conducting walls, said chambers surrounding, respectively, the bottom, sides and rear of said firebox, the first chamber, and the second chamber;

first means including an inlet for communicating with the exterior of the room for introducing outside air into the third chamber, and for directing a flow of outside air successively through the third, second, and first chambers in heat exchange relationship with said walls and the outside surface of said firebox;

second means for directing heated air from said first chamber into said firebox and across the interior surface of said doors when said doors are closed to furnish combustion air within said firebox; and third means for directing heated air from said first chamber into said room.

4,169,459

SOLAR CONVERTER

Brent H. Ehrlich, R.R. 1, Box 269, Murphysboro, Ill. 62966

Filed Jun. 17, 1977, Ser. No. 807,539
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—432 **10 Claims**

1. A solar converter comprising an enclosure having:

an impervious substantially rectangular absorber sheet of solar-energy absorbing material,

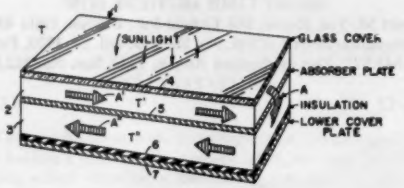
an upper, substantially rectangular flat cover extending parallel to said sheet,

upper spacer means for spacing edge portions of said upper cover from corresponding edge portions of said absorber sheet,

a lower substantially rectangular flat cover extending parallel to said sheet,

lower spacer means for spacing edge portions of said lower cover from corresponding edge portions of said absorber sheet,

said absorber sheet being thin compared with the spacing of said covers from said sheet, and said sheet and said upper and lower covers, together with said upper and lower spacer means, defining therebetween an upper chamber and a lower chamber, respectively, said chambers extending lengthwise of said enclosure,



said upper cover being transparent to solar radiation all the way from the outside of said cover to said upper chamber,

said upper chamber having at one end an inlet for receiving impelled fluid to be heated,

said lower chamber having at said one end an outlet for letting off the heated fluid, and

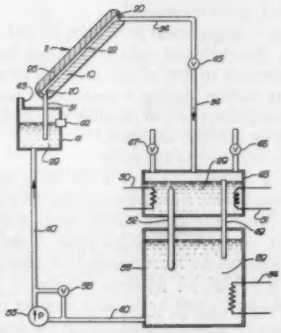
there being provided means for interconnecting said chambers at the other end so that said fluid flows in contact with the upper surface of said absorber sheet in one direction and then in contact with the lower surface of said sheet in the opposite direction.

4,169,460

SOLAR CONVERTER SYSTEM WITH THERMAL OVERLOAD PROTECTION

John M. Popovich, 1717 W. Alameda St., Burbank, Calif. 91506, and Thomas R. Thornbury, 1942 Crestshire Dr., Glendale, of Calif. 91208

Filed Jan. 26, 1977, Ser. No. 762,667
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—422 **12 Claims**



1. In a solar energy conversion system the combination comprising

(a) a solar convertor in which absorptive liquid absorbs solar radiation, the liquid being solar energy absorptive, the convertor including a container having upper and lower manifolds and liquid passage means inclined linearly up-

wardly between the manifolds substantially throughout the entire extent of said passage means,

(b) first means to circulate said liquid for flow through the convertor, to maintain said liquid passage means in the convertor at sub-atmospheric pressure,

(c) means to admit atmospheric pressure air to said liquid passage means to effect drainage of liquid from the convertor in response to an undesirable operating condition in said system, and thereby to prevent convertor overheating, said first means located to permit such drainage, and

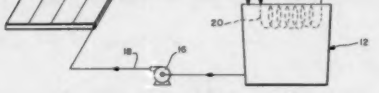
(d) the convertor including a light reflective surface substantially totally covered by the absorptive liquid in operation of said system, and uncovered when the liquid is removed from the convertor to prevent overheating thereof, said surface being extended and adjacent said liquid passage means.

4,169,461

STORGE TANK ESPECIALLY SUITABLE FOR USE IN A SOLAR HEAT SYSTEM

Henry W. Haug, 7470 Boris St., Rohnert Park, Calif. 94928; Gary M. Shon, 5525 Hutchinson Rd., Sebastopol, Calif. 95472, and Albert P. Lenhardt, 762 Pordon La., Healdsburg, Calif. 95448

Filed Oct. 27, 1977, Ser. No. 845,953
Int. Cl.[2] F24J *3/02*
U.S. Cl. 126—437 **28 Claims**



28. In a solar heat heat system utilizing water to store its collected heat, a storage tank for storing said water, said storage tank comprising:

(a) a body defining an internal compartment for containing said water, said body including a top end section, a bottom end section and sidewall means extending between and connected to said top and bottom end sections, said sidewall means including a composite inner layer including means for preventing the passage of water therethrough, said inner layer tapering in thickness between said top end section and said bottom end section and being thicker at said bottom end section;

(b) first means extending through said body for the passage of water directly into and out of said compartment; and

(c) second means extending through said body, said second means being adapted to support at least one heat exchanger within said compartment.

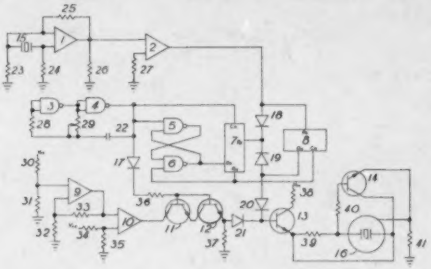
4,169,462

CRIB DEATH DETECTOR

Richard E. Strubé, 3 Meadowood Ct., Bradford, Pa. 16701

Filed May 19, 1977, Ser. No. 798,452
Int. Cl.[2] A61B *5/08*
U.S. Cl. 128—2 R **3 Claims**

1. A portable motion detector for monitoring the respirational activity of a patient, which comprises; piezoelectric transducer means adapted for converting body expansion during the breathing process into electrical signals, counting circuit coupled to the output of said transducer means for producing an output signal representative of the absence of a breathing signal over a predetermined counting period, an oscillator circuit coupled to the input of said counting circuit for providing a signal for counting, an audio output means coupled to the output of said counting circuit for producing a tone signal indicating that respiration has ceased, low voltage detector circuit means coupled to the input of said audio output means for producing an output indicative of supply voltage dropping below a predetermined level, switch means coupled to the



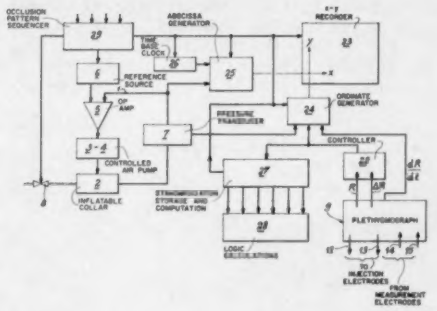
output of said oscillator circuit and to the output of said low voltage detection circuit means for enabling output of said low voltage detection circuit means whereby a pulsating tone signal indicative of a low battery power is produced.

4,169,463

DEVICE FOR RHEOPLETHYSMOGRAPHY BY OCCLUSION

Jean-François Piquard, Vizille, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 6, 1977, Ser. No. 803,776
Claims priority, application France, Jun. 16, 1976, 76 18224
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—693 **14 Claims**



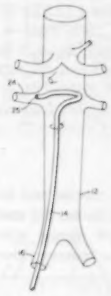
1. A device for rheoplethysmography by occlusion adapted in particular to the study of vascular behavior of a lower limb of a patient comprising pressure-applying means for causing occlusion of a lower limb under study, means for controlling the characteristics of progressive variation in the pressure applied by the pressure-applying means as a function of time during occlusion of the limb under study, a plethysmograph for delivering signals which are representative of an electrical impedance related to said limb under study and of the variations in said electrical impedance, of a normal limb of the same type as the limb under study, and means for determining, from coefficients of standardization which are characteristic of the healthy vascular operation of a normal limb of the same type as the limb under study and said signals, indices which are representative of the vascular behavior of said limb under study, said pressure-applying means including a control loop having a amplifier for establishing a comparison between a predetermined reference value and the value of the pressure within the collar, a transducer for measuring said collar pressure, a circuit means for controlling the inflation of the collar, and a pump which inflates said collar.

4,169,464

CATHETER FOR SELECTIVE CATHETERIZATION OF AORTIC BRANCHES

Ivo Obrez, Brookline, Mass., assignor to Cordis Corporation, Miami, Fla.

Filed Dec. 16, 1977, Ser. No. 861,456
Int. Cl.[2] A61M 25/00
U.S. Cl. 128—657 4 Claims



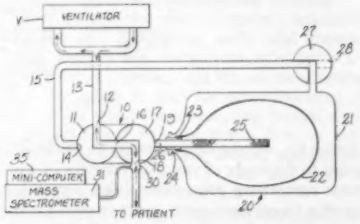
1. A catheter for the selective catheterization of branches of the aorta comprising an elongated tubular member made of material having plastic memory and having a tip portion formed as an incomplete turn of a three-dimensional spiral coil terminating in an extremity extending outwardly from the direction of formation of said spiral coil.

4,169,465

METHOD AND APPARATUS FOR OBTAINING NON-INVASIVE CARDIO-PULMONARY MEASUREMENTS

James A. Walls, 71 Hampton Park E., Branford, Conn. 06405, and Robert P. Howard, E. Hartford, Conn., assignors to James A. Walls, Branford, Conn.

Filed May 4, 1977, Ser. No. 793,513
Int. Cl.[2] A61B 5/08
U.S. Cl. 128—719 8 Claims



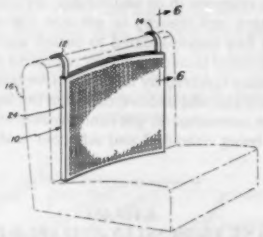
4. Apparatus for obtaining non-invasive cardio-pulmonary measurements comprising, a volume ventilator, a constant volume chamber, a variable volume indicator dilution gas container operatively associated with said chamber, a valving system, means for connecting the valving system to a patient's alveolar environment, and means for sampling and testing for variations in characteristics of an indicator dilution gas from said container, said valving system comprising means for connecting the ventilator to the patient for direct assisted ventilation in one adjusted position and means for connecting the ventilator to the constant volume chamber and for connecting the variable volume container to the patient in another adjusted position to provide for assisted testing, and said sampling and testing means being coupled to said means for connecting the valving system to the patient's alveolar environment.

4,169,466

MASSAGING APPARATUS

Woon-Tong Wong, 14 Upton St., Boston, Mass. 02118

Filed Feb. 2, 1977, Ser. No. 765,094
Int. Cl.[2] A61H 15/00
U.S. Cl. 128—57 2 Claims



1. A massaging apparatus comprising;

a double-walled structure including a first wall, a second wall, and means supporting the walls in parallel spaced relationship, and a plurality of beads supported between the first and second walls, said first wall having a plurality of openings through which the plurality of beads partially extend,

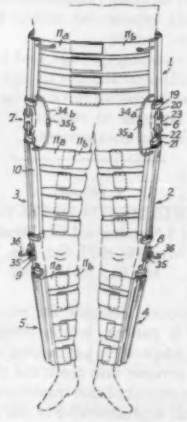
said beads comprising a first group comprising a majority of the beads and a second group of beads larger in size than the first group arranged in a central area of the structure with the first group being disposed on either side of the second group.

4,169,467

ORTHOPAEDIC APPLIANCE FOR ENABLING PARALYTICS TO STAND ERECT

Pierre Rabischong, Saussan, and Jean-Pierre Bel, Montpellier, both of France, assignors to Institut National de la Sante et de la Recherche Medicale - I.N.S.E.R.M., Paris, France

Filed Jul. 20, 1977, Ser. No. 817,502
Claims priority, application France, Jul. 23, 1976, 76 23513; May 13, 1977, 77 15465
Int. Cl.[2] A61F 5/04
U.S. Cl. 128—80 G 8 Claims



1. An orthopaedic appliance for enabling paralytics to stand erect, comprising a plurality of separate pieces of clothing respectively adjustably positionable around the pelvis, thighs and calves of a paralyzed person and each piece having at least

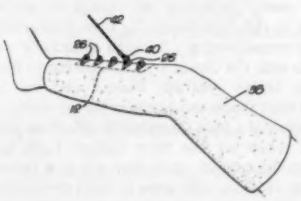
one outer side portion which in use of the appliance encloses the outer side of its respective body part, and six support modules associated with said clothing pieces including a first pair of modules enveloping the calves of the wearer, and four identical modules two of which envelope the wearer's thighs and two of which envelop the wearer's pelvis, said modules each comprising an inflatable structure having two vertical side edges and including a plurality of parallel, flexible and inflatable tubes attached to its associated clothing piece to extend substantially vertically over the outer portion thereof, said modules being located in generally vertical alignment on opposite sides of the wearer's body when in use with the modules enveloping the pelvis being located above the hip joints and the modules enveloping the thighs being between the hip joints and the knee joints; and mechanical support devices associated with each of said modules for connecting together vertically adjacent pieces of clothing in the appliance, said mechanical support devices comprising at least two rows of rigid pins and a mechanical articulation interconnecting said rows of pins and arranged to be located at the level of the body joint between adjacent pieces of clothing, and means for attaching said rows of pins to respective inflatable structures of their associated pieces of clothing, said modules each including a plurality of connecting belts each of which comprises a pair of strips of unstretchable material attached to the respective side edges of the inflatable structure of their associated module at the same height; one of said pair of strips including an eye-ribbon of a Velcro-type fastener on its inner face directed inwardly towards the body of the paralytic and the other of the strips carrying a hook-ribbon of a Velcro-type fastener on its outer face.

4,169,468

MULTIPLE CAST POSITIONER DEVICE

Jack Murphy, 25361 Yale St., Hemet, Calif. 92343

Filed Nov. 3, 1977, Ser. No. 848,198
Int. Cl.[2] A61F *5/04*
U.S. Cl. 128—83 **5 Claims**



1. A multiple cast positioner device for embedding in a cast of a patient's limb, comprising:

an elongated bracket member having a plurality of base slots and face slots, and with recesses in its top portion; and

a traction loop member having a base with its top portion having a pin member at each corner and an eyelet, said traction loop member being insertable into one of said base slots and one of said face slots of said elongated bracket member.

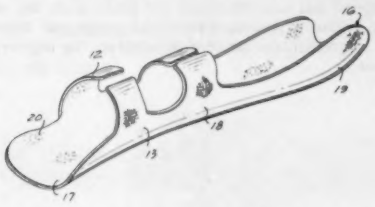
4,169,469

ORTHOPEDIC DEVICE

Elmer M. Arluck, New York, N.Y., assignor to Yardney Company, New York, N.Y.

Division of Ser. No. 758,786, Jan. 12, 1977, which is a continuation of Ser. No. 600,082, Jul. 29, 1975, Pat. No. 4,000,741. This application Jan. 10, 1978, Ser. No. 868,338
Int. Cl.[2] A61F *5/04*
U.S. Cl. 128—90 **6 Claims**

1. A shaped body consisting of a plastic sheet member of a thickness of 50 to 120 mils, a flexural strength of 3,000 to 14,000 psi, a flexural modulus of 0.5×10^5 to 7×10^5 psi and a Vicat softening point of 60° C. to 80° C., an insulating layer having a thickness of at least 10 mils and a coefficient of heat transfer below 2 cal/sec/cm^2/°C.$\times10^{-4}$ on one side of said sheet



member, and a protective layer on the other side of said sheet member, said sheet being shapeable to its final contours by heating to a temperature of 120° F. to 400° F. at said protective layer.

4,169,470

SURGICAL NAIL FOR USE IN SETTING BONE FRACTURES, AND TOOL FOR EMPLACING SAME

Josef Ender, Steinbrecherring 23, Steyr, Austria (4400), and Hans G. Ender, Ferstelgasse 6/20, Vienna, Austria (1090)

Filed Oct. 19, 1977, Ser. No. 843,531
Int. Cl.[2] A61F *5/04*
U.S. Cl. 128—92 BC **24 Claims**

1. A curved flexible and resilient nail for repositioning and fixing fragments of bones, which nail comprises, a proximal end, a curved portion extending from said proximal end, a distal end provided with a coupling element adapted to be connected to means for driving the nail, a first straight portion between said coupling element and said curved portion, a first bend between said distal end and said first straight portion, and a second straight portion between said distal end and said first bend.

4,169,471

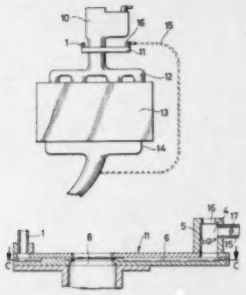
APPARATUS FOR THE PREPARATION OF FUEL MIXTURES FOR CARBURETORS

Paul August, Capellades 1, Barcelona 16, Spain

Continuation-in-part of Ser. No. 541,522, Jan. 16, 1975, abandoned. This application Oct. 17, 1977, Ser. No. 842,686
Int. Cl.[2] F02M *23/04*
U.S. Cl. 123—124 R **15 Claims**

1. In a carbureted mixture compressing internal combustion engine having apparatus for the preparation of liquid fuels by

feeding supplementary air into the engine induction system downstream of a main butterfly valve of the carburetor by way of first and second opposed openings in the induction system where supplementary air flows from the first opening at engine idling speed and supplementary air flows from the second opening within a predetermined load range and depending upon a supplementary air control member, the improvement comprising:



means including the control member, and effective only in the lower power range, for limiting the air flow from the second opening; and

means including the second opening, and effective from the medium power range on into the higher power ranges, for limiting the air flow from the second opening, the supplementary air flowing from the second opening at about the speed of sound in the medium and higher power ranges with the air flow rate remaining relatively constant throughout the medium and higher power ranges.

4,169,472

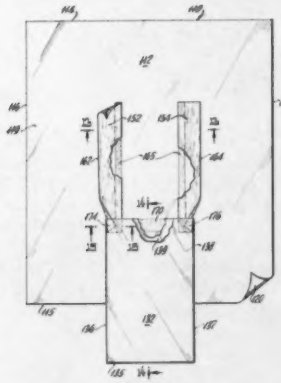
SURGICAL DRAPE

Henrietta K. Morris, Old Bridge, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.

Filed Apr. 17, 1978, Ser. No. 896,838

Int. Cl.[2] A61B *19/06*

U.S. Cl. 128—132 D **18 Claims**



1. A surgical drape comprising a main sheet of generally flexible drapable material, a liquid impervious bag means, and a pair of spaced apart strips of material; said main sheet comprising an upper surface, a lower surface, a bottom edge and a pair of opposed side edges; said bag means comprising a front cover sheet, a back cover sheet, an open end and a closed end and being secured to the upper surface of said main sheet; said strips of material being secured to the upper surface of said main sheet and having flap portions which are free of attachment to said main sheet, the respective bottom ends of said strips of material being located in the open end of said bag means, the lower surface of the bottom ends of said flap portions being secured to the lower surface of the front cover sheet of said bag means, whereby, when said drape is in use, said flap portions may be raised at an angle to the upper surface of said main sheet to provide means for channeling liquids into said bag for storage.

4,169,473

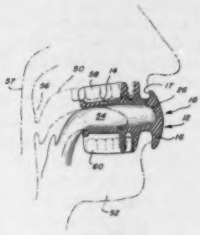
ANTI-SNORING AND ANTI-BRUXISM DEVICE

Charles F. Samelson, 5712 S. Kenwood, Chicago, Ill. 60637

Filed Mar. 3, 1978, Ser. No. 883,270

Int. Cl.[2] A61F *5/56*

U.S. Cl. 128—136 **7 Claims**



1. An anti-snoring and anti-bruxism device comprising, in combination:

imperforate air flow preventing means of a size and shape to be positioned outwardly of and in overlying relation to a user's lips, for preventing the flow of air through the mouth of a user, and tongue engageable means of a size and shape to be removably positioned in the mouth and when so positioned to hold said imperforate means in operative position overlying the user's lips, said tongue engaging means including an elongated socket means connected to the imperforate air flow preventing means, the socket means having a forward closed end and a rearward open end, the closed end connecting to the air flow preventing means centrally thereof and the open end being of a size, shape and location for receiving a portion of the tongue of a user thereinto to effect an airtight seal therewith when air has been sucked from the socket means past the tongue, such that negative pressure, created by the suction, will serve to hold the portion of the tongue in the socket, whereby the tongue is then held forwardly of its usual resting position behind the lower teeth, thereby bringing the remainder of the body of the tongue forward from its normal proximity to the soft palate, the uvula and the posterior pharyngeal wall, to form and maintain an airway of increased size through the naso-pharynx and the oro-pharynx that prevents snoring.

4,169,474

LIQUID MEDICINE DISPENSERS WITH DOSE MECHANISMS FOR ORAL AND INJECTION THERAPY

Wolfgang Wagner, Klosterfelder Weg 29, 1 Berlin 27, Fed. Rep. of Germany

Continuation of Ser. No. 639,685, Dec. 8, 1975, abandoned. This application Jul. 7, 1977, Ser. No. 813,494

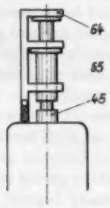
Claims priority, application United Kingdom, Dec. 30, 1974, 56007/74

Int. Cl.[2] A61J *1/00*

U.S. Cl. 128—272.3 **1 Claim**

1. A container, particularly for storing liquid medicine, comprising a casing having walls bounding an interior of the container for keeping the medicine, said casing having one openable end for releasing the medicine therethrough when this end is open and another end spaced from said one end;

means operative for urging the medicine out of the casing through said one end thereof when said one end is open; means for sealingly closing said casing so as to prevent any undesired contamination of the medicine inside the casing and including first means selectively movable from a first position in which it sealingly closes said one end of said casing into a second posi-



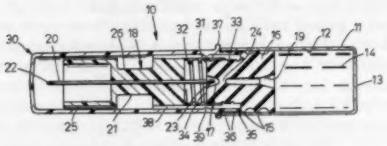
tion it which it opens said one end of the casing for permitting a predetermined amount of the medicine to leave the casing, and from said second position into said first position when the predetermined amount of the medicine has been released from said casing; and external abutments for varying operation of said urging means to thereby vary the amount of the medicine urged out of the casing.

4,169,475

ADDITIVE TRANSFER UNIT

Joseph N. Genese, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Dec. 8, 1977, Ser. No. 858,494
Int. Cl.[2] A61J *1/00*
U.S. Cl. 128—272.3 **14 Claims**



1. An additive transfer device for storing and transferring of a medicament to a solution container having a pierceable closure comprising:

an additive container for storing the medicament to be transferred, said additive container having rigid walls and a slidable, pierceable stopper in said container;

a holder member;

a piercing member having a channel therethrough for the flow of said medicament and a piercing point on both ends thereof, an intermediate portion of said piercing member secured by said holder member;

guide means defined by said holder member, said guide means positioned from said piercing member and terminating inwardly of one end of said piercing member;

a cover member adapted to extend over said holder member and said one end of said piercing member extending beyond said guide means; and

said holder member and said additive container being interconnected to permit movement of said holder member and said piercing member toward said additive container;

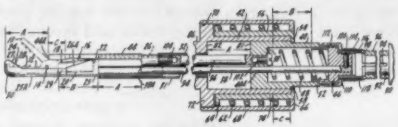
so that upon movement of said holder member and container said additive container will initially move over said holder member to effect a piercing of said additive container stopper and upon removal of said cover member and penetration of said solution container closure by the other piercing end of said piercing member, the contents of said additive container can be expelled into said solution container by further movement of said additive container over said stopper and said holder member.

4,169,476

APPLICATOR FOR SURGICAL CLIP

Siegfried Hiltebrandt, Knittlingen, Fed. Rep. of Germany, assignor to Wolf Medical Instruments Corporation, Rosemont, Ill.

Filed Aug. 12, 1977, Ser. No. 824,065
Int. Cl.[2] A61B *17/10, 17/12*
U.S. Cl. 128—325 **12 Claims**



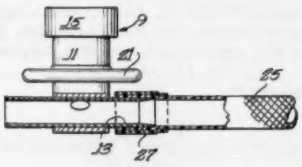
1. An applicator for applying a hinged clip to a fallopian tube, in which the clip has a pair of normally open jaws, one to be closed on the other and then the two locked by a clasp spring slidably supported on the jaws for movement to an actuated jaw locking position, said applicator comprising an outer tube containing both an axially moveable first push rod having a free end including means for closing the one jaw and a second axially moveable push rod having a free end including means for actuating the spring, a cradle supported at the forward distal end of the outer tube to support the clip with the open jaw adjacent the free end of the first push rod, a guiding cylinder attached to said outer tube, a first plunger slidably disposed within said guiding cylinder and having said first rod attached thereto, a second plunger slidably mounted in the first plunger and having the second push rod attached thereto, first spring means tending to bias the second plunger to a retracted position inside the first plunger and flexibly coupling the second plunger to the first whereby a forward thrust exerted by the thumb on the second plunger causes both plungers and both rods to move forwardly in unison from a retracted position within said guiding cylinder, a first stop on said cylinder for limiting forward movement of the first plunger and first rod to a position where said one jaw has been closed while the second rod remains displaced from the clip spring, whereafter a further thrust by the thumb compresses said first spring allowing the second rod to move forwardly to actuate the clip spring, and a rearward extension on the second plunger enabling thumb pressure to be exerted.

4,169,477

ANASTOMATIC COUPLINGS

Jack C. Bokros, Alpine, Calif., assignor to CarboMedics, Inc., San Diego, Calif.

Filed Jul. 7, 1977, Ser. No. 813,538
Int. Cl.[2] A61B *17/11*
U.S. Cl. 128—334 R **10 Claims**



1. A method of attaching a vascular graft to an implantable prosthetic device including a rigid tubular portion, which method comprises

providing a tubular vascular graft having an inner diameter approximately equal to the outer diameter of the rigid tubular portion,

providing a heat-shrinkable polymeric sleeve having an inner diameter at least equal to the outer diameter of the

vascular graft and having an end portion which tapers to a substantially smaller wall thickness,

assembling the vascular graft on the rigid tubular portion with said polymeric sleeve disposed in surrounding relation to the portion of the graft in contact with the tubular portion and said tapering end portion extending for a distance past the free end of said tubular portion and

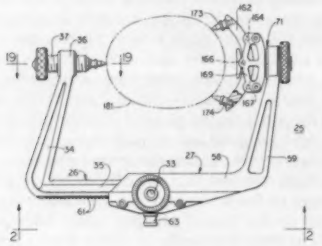
heating said assembly to shrink the sleeve into firm compressive contact with the vascular graft so that the portion of the graft just adjacent the end of the tubular portion is compressed and firmly supported by said shrunken sleeve whereby there is a smooth transition in stiffness that eliminates formation of a culdesac.

4,169,478

SURGICAL HEAD CLAMP

Horst R. Hickmann, Anderson Township, Hamilton County, Ohio, assignor to Ohio Medical Instrument Company, Inc., Cincinnati, Ohio

Filed Mar. 15, 1978, Ser. No. 886,730
Int. Cl.[2] A61B *19/00*
U.S. Cl. 128—346 **5 Claims**



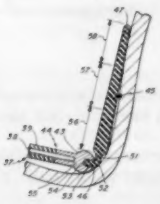
1. A surgical head clamp which comprises a framework, means for supporting the framework, a first head engaging pin means supported on the framework, a bracket rotatably supported on the framework aligned with and spaced from the first head engaging pin means, spaced second and third head engaging pin means mounted on the bracket, means for advancing the first head engaging pin means axially toward the bracket to cause the head engaging pin means to engage the head, the first head engaging pin means being aligned with the axis of rotation of the bracket, and means for releaseably locking the bracket in selected position, the bracket being releaseable to permit turning of the head about said axis without releasing the head engaging pin means from the head.

4,169,479

ELONGATED, TAPERED FLEXIBLE FRONT GUIDE FOR ELECTRICAL CATHETERS AND METHOD OF USE

Rudolph Muto, 24 William St., Andover, Mass. 01810

Continuation-in-part of Ser. No. 771,526, Feb. 24, 1977, abandoned. This application Jun. 8, 1978, Ser. No. 913,558
Int. Cl.[2] A61N *1/04*
U.S. Cl. 128—419 P **8 Claims**



1. A uni-polar endocardial lead, for connection to a cardiac pacemaker to electrically stimulate the heart, said lead comprising:

an elongated, flexible tube of non-electrically conductive material, substantially inert to body fluids and tissue, having a length of electrically conductive, flexible wire extending therethrough, one end of said wire electrically connected to said pacemaker and the other end of said wire being connected to an exposed electrode;

and an elongated, tapered integral guide of resilient, flexible non-conductive material in forward extension of said exposed electrode, and of generally "rattail" configuration with a free terminal tip;

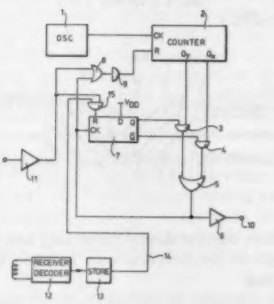
said guide having a base portion, proximate its joinder to said exposed electrode, of high bendability and flexibility to form an elbow joint between said electrode and the remainder of said guide to permit said guide to curl, or bend, at approximately ninety degrees when said tip engages a wall within said heart.

4,169,480

DEMAND PACER WITH PROGRAMMABLE RATE HYSTERESIS

Dennis Digby, Brooklyn Park, Minn., and John W. Keller, Jr., Miami, Fla., assignors to Biotronik Mess- und Therapiegerate GmbH & Co., Berlin, Fed. Rep. of Germany

Filed Jun. 19, 1978, Ser. No. 917,141
Claims priority, application United Kingdom, Aug. 19, 1977, 34913/77
Int. Cl.[2] A61N *1/36*
U.S. Cl. 128—419 PG **5 Claims**



1. In a programmable pacer system having a remote programming means, an implantable cardiac pacer having remotely programmable rate hysteresis comprising:

(a) free running timing means having a fixed, predetermined rate;

(b) counting means, responsive to said timing means, for counting at least to respective first and second count states;

(c) output amplifier means, for generating artificial stimulating pulses;

(d) input amplifier means for sensing naturally occurring heartbeat signals;

(e) switching means, alternatively responsive to said states, for energizing said output amplifier means;

(f) local memory means, responsive to said remote programming means, for conditioning said pacer system to operate alternatively in conventional demand pacing mode at a rate determined by successive achievement of said first state, or in rate hysteresis mode;

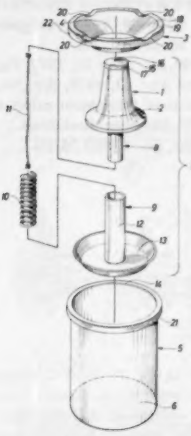
(g) logic means, energized by said local memory means for said hysteresis mode, and responsive to said input amplifier means, for conditioning said switching means to respond to achievement of said second state upon at least one sensing of a natural heartbeat signal.

4,169,481

ÅSHTRAY WITH DEPRESSIBLE RESILIENT CENTRAL SECTION

Ake A. Hultberg, S-150 30, Mariefred, Sweden

Filed Aug. 3, 1977, Ser. No. 821,505
Claims priority, application Sweden, Aug. 4, 1976, 7608733
Int. Cl.[2] A24F *19/04*
U.S. Cl. 131—237 11 Claims



1. An ashtray having a central depressible resilient section comprising:

an ash collecting container;

a lid, having a central aperture, mounted on said container;

a vertically extending depressible member having a peripherally extending outer seating surface normally biased into sealing into sealing engagement with said lid within the aperture thereof, an upper portion of said depressible member projecting upwardly through said lid aperture and said seating surface being angularly inclined relative to the cooperable engaging surface of the lid;

a support member located in said container, a guide rod secured to one of said depressible and support members and a guide sleeve provided on the other of said depressible and support members, said guide rod being dimensioned to slide within said guide sleeve to telescopically connect said depressible and support members, said guide rod is secured within said depressible member so as to depend therefrom, said support member including a transversely extending dish-like portion given a peripheral configuration complementary with the inner surface of the container and dimensioned to provide a relatively small clearance therewith, said guide sleeve being secured to the center of said dish-like portion to project upwardly therefrom, said support member thus serving to center the guide sleeve and rod so as to insure proper seating of said depressible member within the aperture of said lid.

4,169,482

FASTENER FOR A HAIR ROLLER

Walter J. Kulpa, Norwalk, Conn., assignor to Remington Products, Inc., Bridgeport, Conn.

Filed Nov. 15, 1976, Ser. No. 741,920
Int. Cl.[2] A45D *2/00*
U.S. Cl. 132—40 5 Claims

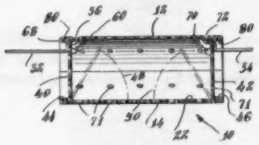
1. A hair roller resiliently expandable from a substantially flat storage configuration into an elongated generally cylindrical-shaped body which is substantially resistant to bending and buckling to externally applied finger force when readied for use, said hair roller comprising;

a. two resiliently flexible rectangular-shaped substantially flat body members having substantially the same width and the same length,

b. each of said body members having opposed longitudinal marginal portions terminating in longitudinal edges, said body members being arranged in an overlying relationship with the longitudinal edges of one of said body members in an aligned co-extensive relationship with corresponding longitudinal edges of the other of said body members,

c. means secured to each of said opposed marginal portions in bridging relationship with said aligned longitudinal edges for hinge coupling said body members to each other forming a hinge coupled hair roller body having a substantially flat configuration, said hair roller body being resiliently deflectable to form a hair roller having a generally cylindrical-shaped configuration,

d. a fastener member enclosed within the hair roller body and having opposed ends, one end of said fastener member being rotatably secured to one of said body members, the opposite end of said fastener member extending within said substantially flat hair roller body on a plane parallel to and between the overlying body members, said fastener member being operable for rotation within said hair roller body relative to said secured end for deflecting the hair roller body into said cylindrical-shaped configuration,



e. detenting means integrally formed in said hair roller body in the path of travel of said fastener member, said fastener member being releasably engageable with said detenting means for maintaining said hair roller body in said deflected configuration, the resiliency of said hair roller body urging said hair roller into said substantially flat configuration upon release of said fastener member from said detenting means, and

f. said detenting means including a dimpled segment formed in said other body member adjacent a distal end of the hair roller body, said dimpled segment having a surface portion projecting from the inner surface of said other body member in the path of travel of said fastener member, said fastener member and said hair roller body being resiliently deformed upon rotation of said fastener member into engagement with and past said surface portion of the dimpled segment, said detent means further including an outer segment of said other body member longitudinally spaced from said dimpled segment in the direction of said distal end in the path of travel of the fastener member, said dimpled segment and said outer segment captivating said fastener member therebetween and preventing rotation of the fastener member outward of the hair roller.

4,169,483

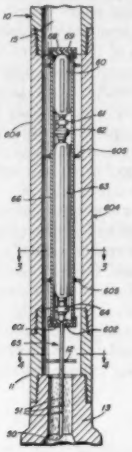
HYDRAULIC JET DRILL STEM AND BIT UNPLUGGING DEVICE

Thomas S. Bonn, P.O. Box 5601, Reno, Nev. 89513

Filed May 26, 1978, Ser. No. 910,209
Int. Cl.[2] B08B *3/02, 9/02*
U.S. Cl. 134—94 8 Claims

1. In a drill string containing a drill bit, a drill unplugging apparatus comprising: a source of high pressure gas, a source of liquid in operative communication with said high pressure gas, whereby said liquid is maintained at a high pressure, a valve means connected to said source of liquid, and a nozzle

means connected to said valve means and having at least one dispensing hole disposed thereon through which said liquid is forced at a high rate of speed when said valve means is opened, and further wherein said valve means is a pressure actuated



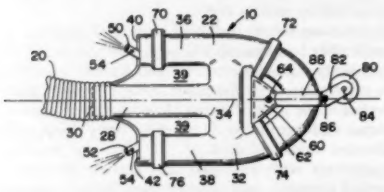
valve which opens in response to pressure within said drill string rising above a predetermined maximum and closes in response to said pressure falling below a predetermined minimum.

4,169,484

AUTOMATIC POOL CLEANER APPARATUS

Josef Bonigut, 2775 Tumwater Dr., Walnut Creek, Calif. 94598; Ramon E. Lindberg, 65 Monte Cresta Ave., Pleasant Hill, Calif. 94523, and Peter K. Darm, 5278 Concord Blvd., Concord, Calif. 94521

Filed May 30, 1978, Ser. No. 910,827
Int. Cl.[2] B08B *3/02, 9/08*
U.S. Cl. 134—167 R **13 Claims**



1. An automatic cleaning apparatus for swimming pools and the like comprising:

flexible elongated conduit means connected at one end to a source of water under pressure;

propulsion means comprising:

(i) a body portion, including a symmetrical top and bottom side, said body portion operatively connected to the second end of said conduit means, said conduit means acting to communicate water under pressure to said body portion; and

(ii) fluid outlet means operatively connected to, and in fluid communication with, said body portion, comprising a plurality of output ports positioned in a symmetrical relationship on opposite sides of said conduit means and oriented such that water discharged therethrough is directed substantially axially of said second end of said conduit means in a direction opposite from the direction of water flow in said conduit means, said propulsion means operative to move said body portion and said conduit means in a random manner adjacent to the surfaces of the pool; and

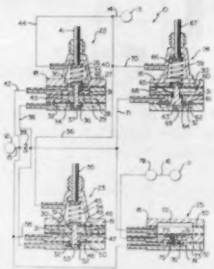
means for redirecting the direction of movement of said body portion out of a corner or recess in said pool comprising a wheel operatively attached to the leading end of said body portion and positioned offset to one side thereof.

4,169,485

METHOD OF OPERATING A CONTROL SYSTEM

Harold G. Brakebill, Concord, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 800,211, May 25, 1977, Pat. No. 4,099,539.
This application Apr. 12, 1978, Ser. No. 895,775
The portion of the term of this patent subsequent to Jul. 11, 1995, has been disclaimed.
Int. Cl.[2] G05D *16/00*
U.S. Cl. 137—14 **10 Claims**



1. A method of operating a control system having a first source provided with a changeable fluid pressure value, a second source having a changeable vacuum value, and a pressure operated control device that changes its operating condition in relation to the value of a pressure signal directed thereto, said method comprising the steps of operatively interconnecting a pneumatically operated control means to said sources and said control device, increasing said pressure signal from said first source to said device with said control means as the pressure value from said first source increases from a first value thereof to a second value thereof, thereafter, decreasing said pressure signal from said first source to said device with said control means as the pressure value from said first source further increases from said second value thereof to a third value thereof, and producing said signal in substantially the same manner with said control means but at different values from different levels of vacuum at said second source thereof.

4,169,486

GAS SUPPLY SYSTEM WITH PURGE MEANS

John H. Otteman, 11940 E. Washington Blvd., Whittier, Calif. 90606, and William M. Gray, 1191 Lenor Way, San Jose, Calif. 95128

Filed May 6, 1977, Ser. No. 794,026
Int. Cl.[2] B08B *9/02*
U.S. Cl. 137—240 **7 Claims**

1. A gas supply system comprising:

a supply conduit having an inlet and an outlet, and a downstream direction of flow from said inlet to said outlet;

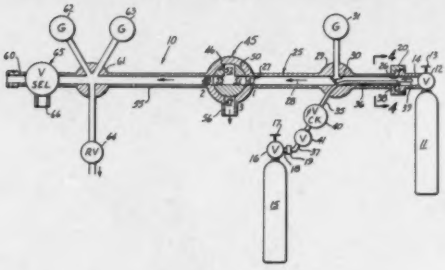
a delivery conduit;

a vent conduit;

a selector valve having a first port connected to said outlet, a second port connected to the delivery conduit, and a third port connected to the vent conduit, said selector valve being so constructed and arranged as selectively to interconnect said first and second ports in a first setting, said first and third ports in a second setting, and none of them in a third setting;

a purge conduit having an inlet and a discharge port,said purge conduit entering said supply conduit, said discharge

port being directed upstream in said supply conduit and discharging adjacent to the inlet of the supply conduit,
said supply conduit inlet being adapted to receive a first gas from a valved source thereof,
said purge conduit inlet being adapted to receive a second gas from a source thereof; and
valve means in said purge line between its inlet and discharge port,
whereby with the said selector valve in said second setting, said valve means can be opened to discharge second gas



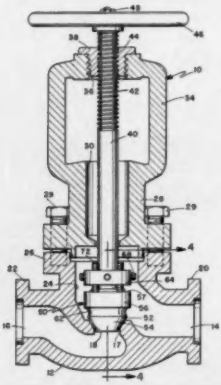
into said supply conduit to purge gases present in said supply conduit therefrom by sweeping action and discharge through the third port, and said valve means can then be closed and said selector valve be set in its third setting, and the source of first gas removed and replaced, and the selector valve can thereafter be returned to said second setting and said valve means opened for further purging with second gas, and thereafter said valve means can be closed to stop supply of second gas, and said selector valve can be set to said first setting to supply first gas to the delivery conduit.

4,169,487

GLOBE-VALVE LOCKING APPARATUS FOR VALVE LAPPING

Robert L. Watson, 1605 Morningside Dr., Merritt Island, Fla. 32952

Filed Jun. 20, 1977, Ser. No. 807,891
Int. Cl.[2] F16K *29/00*
U.S. Cl. 137—243.4 **2 Claims**



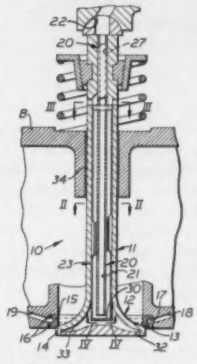
1. A valve disc to stem locking tool adapted for use in combination with a globe valve having a valve disc rotatably mounted on the end of a valve stem for locking the valve disc and stem together, said tool comprising:
an annular body member for encircling the stem of a valve and sized to fit within the valve housing,
a plurality of screws adjustably mounted in radially extending bores in said body member for adjustably engaging and gripping said valve stem, and
a plurality of screws each having a head and an opposite gripping end adjustably mounted in said body member in a plurality of bores disposed around and extending parallel to the axis of said body member and having said gripping end extending from said body member and disposed for adjustably engaging and gripping a valve disc mounted on the valve stem.

4,169,488

COOLED ENGINE VALVE

Alexander Goloff, East Peoria, and Richard A. Cemenska, Edelstein, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Nov. 23, 1977, Ser. No. 854,188
Int. Cl.[2] F01P *3/14;* F16K *49/00;* F01L *3/14, 3/18*
U.S. Cl. 137—340 **16 Claims**

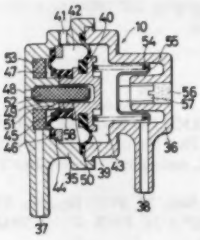


1. A valve comprising
an elongated hollow stem,
a head secured to an end of said stem and defining an annular face thereon,
circulation means disposed in said valve for circulating a first coolant therethrough, said circulation means comprising first tube means disposed in said stem to define first passage means therethrough and second tube means disposed radially between said first tube means and said stem in substantial coextensive relationship therewith to define second passage means between said first and second tube means communicating with said first passage means whereby said first coolant may be circulated through said first and second passage means, and
closed passage means disposed in heat exchange relationship relative to said circulation means for retaining a second coolant therein for transferring heat to said first coolant, said second tube means being fluted to comprise a plurality of circumferentially disposed flutes secured radially between said stem and said first tube means and wherein said closed passage means comprises a plurality of elongated and circumferentially disposed passages defined by said flutes radially between said second tube means and said stem and disposed in heat exchange relationship relative to said second passage means.

4,169,489
FLUID FLOW CONTROL VALVE MECHANISM

Masami Inada, and Takeharu Ohumi, both of Kariya, Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 28, 1977, Ser. No. 819,916
Claims priority, application Japan, Aug. 3, 1976, 51-103624[U]
Int. Cl.[2] E03B 7/07
U.S. Cl. 137—545 6 Claims



5. A fluid flow control valve mechanism comprising a body having inlet, outlet and signal ports, moveable means disposed within said body comprising a moveable member and a pair of spaced apart annular diaphragms, the inner peripheries of said diaphragms being connected to said moveable member and the outer peripheries of said diaphragms being connected to said body respectively, said body in one of said diaphragms defining a signal chamber in communication with said signal port, said body and the other of said diaphragms defining a control chamber in communication with said inlet and outlet ports, additional port means connecting the chamber defined intermediate said diaphragms with the atmosphere, a hollow elongated cylindrical spool member disposed within said control chamber with the interior thereof in communication with said inlet port and having a plurality of orifices disposed along the length thereof, said moveable member having a blind bore in which said spool member is received and an annular valve portion located in said bore for controlling communication between the inlet port and outlet port through the apertured spool member and control chamber, biasing means biasing said moveable member against a signal pressure in said signal chamber, first filtering means disposed within said hollow spool member and second filtering means disposed in said control chamber in front of said outlet port.

4,169,490
PILOT OPERATED FOUR WAY VALVE

John F. Taplin, 15 Sewall St., West Newton, Mass. 02165

Filed Jun. 3, 1977, Ser. No. 803,001
Int. Cl.[2] F15B 13/042
U.S. Cl. 137—596.18 3 Claims

1. A pilot valve for reversing the flow of fluid in a pair of pipes comprising in combination

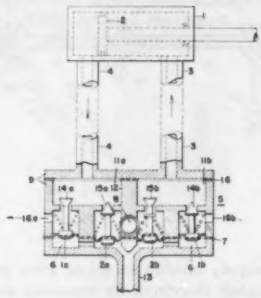
(a) a first pair of rolling diaphragm devices each operating one of a first pair of spring-biased valves (**15***a*,**15***b*), said first pair of rolling diaphragm devices being operable by fluid pressure against the action of the spring-bias on said first pair of valves (**15***a*,**15***b*), one (**15***a*) of said first pair of valves being open and the other (**15***b*) of said first pair of valves being closed in the absence of fluid pressure upon said first pair of rolling diaphragm devices;

(b) a second pair of rolling diaphragm devices each operating one of a second pair of spring-biased valves (**14***a*,**14***b*), said second pair of rolling diaphragm devices being operable by fluid pressure against the action of said spring-bias on said second pair of valves (**14***a*,**14***b*), one (**14***a*) of said second pair of valves being open and the other (**14***b*) of said second pair of valves being closed in the absence of fluid pressure upon said second pair of rolling diaphragm devices;

(c) a fluid duct (**13**) for selectively admitting or withholding fluid pressure from said first pair of rolling diaphragm devices and said second pair of rolling diaphragm devices;

(d) a pair of non-communicating chambers (**11***a*,**11***b*) including a first chamber (**11***a*) and a second chamber (**11***b*) each of said pair of chambers being connected to one of said pair of pipes;

(e) a first admission passageway for admitting fluid under pressure to said first chamber (**11***a*) from a third pipe (**8**) with fluid under pressure and a first venting passageway



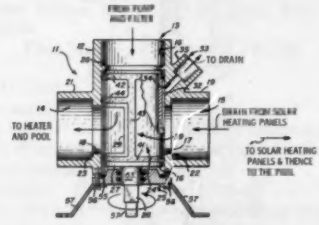
for simultaneously venting said second chamber (**11***b*), said first admission passageway being controlled by said one (**15***a*) of said first pair of valves (**15***a*,**15***b*) and said first venting passageway being controlled by said other (**14***b*) of said second pair of valves (**14***a*,**14***b*); and

(f) a second admission passageway for admitting fluid under pressure to said second chamber (**11***b*) from said third pipe (**8**) with fluid under pressure and a second venting passageway for simultaneously venting said first chamber (**11***a*), said second admission passageway being controlled by said other (**15***b*) of said first pair of valves (**15***a*,**15***b*) and said second venting passageway being controlled by said one (**14***a*) of said second pair of valves (**14***a*,**14***b*).

4,169,491
THREE PORT TWO-WAY DIVERTER VALVE WITH INTEGRAL DRAIN ON ONE OUTPUT PORT

Peter Bajka, Los Altos, Calif., assignor to Bajka Engineering Enterprises, Mountain View, Calif.

Filed Nov. 18, 1977, Ser. No. 852,862
Int. Cl.[2] F16K 11/085
U.S. Cl. 137—625.47 7 Claims



1. A valve comprising:

a valve body having a cavity with first, second, third and fourth openings intersecting with said cavity, said fourth opening being a drain opening;

a valve member rotatably positioned in said cavity;

said valve member having a generally cylindrical exterior

surface and a hollow configuration with an end opening in alignment with said first opening;

a side opening in said valve member positioned at substantially a right angle with respect to said end opening thereof, said valve member being formed and arranged for rotation about an axis of revolution to bring said side opening thereof into or out of alignment with said second opening or said third opening of said valve body so as to establish flow communication between said first and second openings or between said first and third openings;

said side opening of said valve member having a width which is sufficient to span a distance between said second and third openings such that said valve is always open with flow communication being provided between said first opening and both said second and third openings when said valve member is in an intermediate angular position with said side opening of said valve member out of alignment with said second opening and out of alignment with said third opening; and

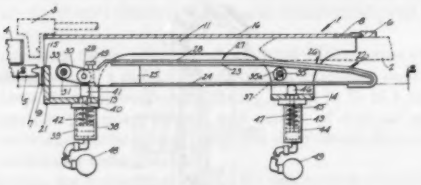
said valve member having a drain passageway defined therein to provide fluid communication therethrough between said third and fourth openings of said valve body when said side opening of said valve member is in alignment with said second opening, whereby fluid communication is established between said fourth drain opening and said third opening via the intermediary of said drain passageway.

4,169,492

SHUTTLE BOX FOR LOOMS

Raymond J. Grady, Albany, N.Y., assignor to Huyck Corporation, Wake Forest, N.C.

Filed Mar. 27, 1978, Ser. No. 890,265
Int. Cl.[2] D03D *49/56*
U.S. Cl. 139—185 **12 Claims**



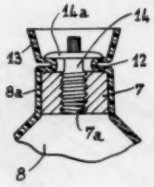
1. A shuttle box for use with a loom on which a shuttle is picked between opposing shuttle boxes, said shuttle box having a wall surface defining one side of a shuttle receiving cell, an elongated binder defining the opposite side of said cell, said binder having a shuttle contacting surface the leading portion of which is tapered and the trailing portion of which is planar, means mounting said binder for movement toward and away from said wall surface, adjustment means for positioning said binder relative to said wall surface so that the distance between the planar portion of said binder and said wall surface is less than the width of the shuttle to be received in the cell defined therebetween, a first fluid pressure means positioned to contact the binder adjacent its tapered leading end for applying pressure to said binder in a direction to resist initial deflection of the binder by a shuttle entering said cell, and a second fluid pressure means positioned to contact the binder at its trailing end for applying pressure to said binder in a direction to resist deflection of the binder as the shuttle contacts the planar trailing portion of the binder, whereby to provide controlled gradual deceleration of the shuttle.

4,169,493

FLEXIBLE HOT WATER BOTTLE

Joseph Segalowicz, 181 Ave. Renoir, 06210 Mandelieu, France

Filed May 10, 1978, Ser. No. 904,415
Claims priority, application France, May 13, 1977, 77 16031
Int. Cl.[2] B65D *11/20*
U.S. Cl. 150—2.1 **2 Claims**



1. A flexible hot water bottle having the shape of a flat sack comprising:

an internally threaded neck portion formed by an insert of plastics material having a periphery subjected to superficial fusion; and

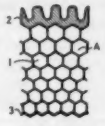
a sack portion having a first portion fused to and extending above the periphery of said insert and a second portion integral with and extending below the periphery of said insert to form a sack, the sack having an external peripheral bead extending there around, the peripheral bead being formed by pinching together walls of a parison used to form the sack.

4,169,494

SELF-SUPPORTING MOTOR-VEHICLE TIRE

Wladyslaw Kubica, ul. Smoluchowskiego 8/15, Krakow, Poland (30083), and Oskar Schmidt, Kittsee (Burgenland), Austria

Filed Apr. 27, 1977, Ser. No. 791,206
Claims priority, application Poland, May 4, 1976, 189286
Int. Cl.[2] B60C *17/00*
U.S. Cl. 152—310 **5 Claims**



1. In a self-supporting motor-vehicle tire comprising an inner ring, an outer ring and a honeycomb-cell structure coaxially supporting said outer ring on said inner ring, said outer ring being provided with tread-forming peripheral ribs,

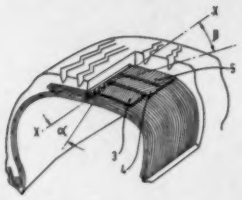
the improvement wherein the cells of said structure extend axially in a multiplicity of annular rows centered on the ring axis and the number of cells in each of said rows substantially corresponds to the number of said ribs, said cells having walls whose average thickness is less than approximately one-thirtieth of the axial width of said rings and said structure, the average cross-sectional area of the interior of each cell expressed in cm^2 being less than about one-tenth of said axial width measured in centimeters.

4,169,495

RADIAL TIRE FOR MOTOR VEHICLES

Luigi Maiocchi, Milan, Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

Continuation of Ser. No. 753,290, Dec. 22, 1976, abandoned.
This application Sep. 18, 1978, Ser. No. 943,232
Claims priority, application Italy, Jan. 5, 1976, 19019 A/76
Int. Cl.² B60C *9/20*
U.S. Cl. 152—361 R **3 Claims**



1. In a pneumatic radial tire for vehicles having a tread, a carcass having a crown, a tread band, and a breaker structure disposed at the crown of the carcass between said tread and said carcass to support the tension stresses in the longitudinal direction in said radial tire during use, said breaker structure comprising two layers of metallic cords, said layers being approximately equal in width to the width of the tread, said cords being parallel to one another in each layer and crossed with respect to those of the adjacent layer and arranged so that said cords are aligned with respect to the longitudinal direction of the tire at an angle between 5° and 30°, said cords having an ultimate elongation between 2.6% and 3.2%,

the improvement wherein,

there is placed in a radially outer position to said layers at least one layer of metallic cords having a width substantially equal to that of said tread, said cords being constituted by a plurality of strands wound together, said cords of the radially outer layer being arranged parallel to one another and in a longitudinal direction and having an ultimate elongation between 4% and 8%, the individual strands constituting said cords and the resulting cord being wound in the same sense, the cords of the radially outer layer providing a layer which cooperates with the radially inner layers in bearing said tension stresses, the layer or layers of metallic cords having an ultimate elongation between 4% and 8% being the radially outermost layer(s).

4,169,496

RUN-FLAT TIRE AND WHEEL ARRANGEMENT WITH INVERTED BEAD INTERLOCK

Roy S. Cataldo, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 31, 1977, Ser. No. 847,059
Int. Cl.² B60C *15/02, 15/04*
U.S. Cl. 152—379.1 **1 Claim**

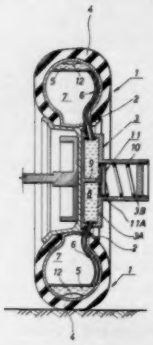
1. A wheel and beaded pneumatic tire combination, said wheel comprising an annular wheel disc, a one-piece rim for said wheel disc providing the sole mounting for said tire, said rim including a centralized annular channeled portion having an inner annular base secured to the outer periphery of said wheel disc, said channeled portion further having a pair of inner annular walls which diverge outwardly with respect to one another to a predetermined distance outwardly from said base, said rim further including a pair of cylindrical run-flat shoulder portions extending laterally outwardly from the outer portions of each of said diverging walls to provide annular rigid wheels for load support in the event of deflations of said tire, each of said shoulder portions having an annular outer side flange laterally offset from a corresponding one of said inner annular walls, each of said outer side flanges extending generally downwardly from the outermost extremity of said shoulder portion and providing a flat surface to a point where it terminates in an inwardly hooked annular tire-bead channel of approximately 180°, a tire inflation valve operatively mounted in one of said annular side flanges providing an air passage to the interior of said tire, said tire comprising a carcass, said carcass having annular side walls with interior surfaces contacting said side flanges corresponding therewith, said carcass having an outer annular tread portion adapted to engage a roadway, said carcass further having an annular inverted loop formed on the inner end of each of said side walls, said carcass having an annular bead formed in each of said inverted loops, said inverted loops being mounted in said tire-bead channels of said rim such that said loops are speced radially inwardly from said run-flat shoulders and are pneumatically sealed against the inner surfaces of said side flanges.

4,169,497

METHOD AND DEVICE FOR AUTOMATICALLY INCREASING THE RESTORING FORCE OF A PNEUMATIC TIRE

Yasuo Tsuruta, 22-2, 4-chome, Sanno, Ota-ku, Tokyo, Japan

Filed May 31, 1977, Ser. No. 801,780
Int. Cl.² B60C *23/12*
U.S. Cl. 152—418 **5 Claims**



1. Apparatus for automatically increasing the restoring force of a pneumatic tire comprising,

a rim;

a pneumatic tire on the rim;

a liquid containing bag extending along an internal surface of the tire in opposed relation to a tread of the tire;

an air chamber between the rim and the liquid bag;

a liquid containing chamber on said rim;

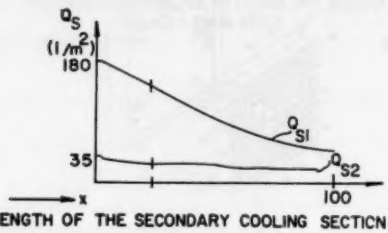
passage means connecting said chamber to said bag;

said liquid chamber and passage means comprising means for centrifugally forcing liquid into said bag in proportion to the rotational speed of the tire so that liquid forced into said bag increases the pressure in the air chamber of the tire and the centrifugal force of the liquid rapidly restores deformation of the tread.

4,169,498
METHOD FOR THE SECONDARY COOLING OF A METAL STRAND

Werner Wilhelm, Auf der Ürfte 3a, 4320 Hattingen 13, Fed. Rep. of Germany

Filed Nov. 4, 1977, Ser. No. 848,597
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1976, 2651573
Int. Cl.[2] B22D *11/124, 11/12*
U.S. Cl. 164—4 8 Claims



1. A method for secondary cooling of a metal strand of steel in particular, which is continuously cast in a continuous casting mould, by the quantity-controlled spraying of a coolant in individual cooling areas by means of nozzles on area portions of the strand surface, which as a consequence of advance of the strand are intermittently cooled in the sprayed area portions and reheated in the unsprayed portions by the continuing heat flow from the inside of the strand, whereby the coolant quantities which are fed to the nozzles of the individual cooling areas are controlled according to predetermined values, comprising the steps of

controlling the coolant quantity per unit time Q_l (l/min) fed to each nozzle proportionally to the strand advance speed as a function of predetermined values of the coolant quantity Q_S (l/m²) which is fed to each strand surface unit by a nozzle,

determining the location of the individual cooling areas by a distance x of a nozzle of each of said individual cooling areas from the continuous casting mould in % of a total secondary cooling length, said nozzle of each of said individual cooling areas being that most distant from the continuous casting mould,

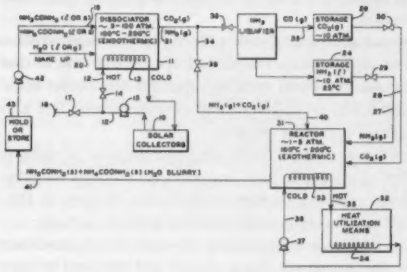
adjusting the coolant quantity Q_S for said individual cooling areas to values, which in a graph of the coolant quantity Q_S over the secondary cooling length lie between points of intersection of perpendicular lines drawn at the location of said nozzle of each of said individual cooling areas plotted on the abscissa with curves of the formulae

$[S_{S1}]\ Q_{S1}$ (l/m²)	=	0.3637	$\cdot 10^{-7}x^5$
		+9.5677	$\cdot 10^{-6}x^4$
		−0.08935	$\cdot 10^{-2}x^3$
		+0.03560	$\cdot x^2$
		−0.8029	$\cdot x$
		+34.27	
and			
Q_{S2} (l/m²)	=	−5.08378	$\cdot 10^{-9}x^6$
		+1.780545	$\cdot 10^{-6}x^5$
		−2.413606	$\cdot 10^{-4}x^4$
		+1.56592	$\cdot 10^{-2}x^3$
		−0.46323	$\cdot x^2$
		+2.607	$\cdot x$
		+176.8	

4,169,499
SOLAR ENERGY HEAT UTILIZATION

Richard T. LeFrois, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 801,949, May 31, 1977, abandoned. This application Jul. 12, 1978, Ser. No. 924,032
Int. Cl.[2] F28D *15/00*
U.S. Cl. 165—1 13 Claims



1. A method of low temperature energy utilization comprising steps of:

receiving input energy from a source;

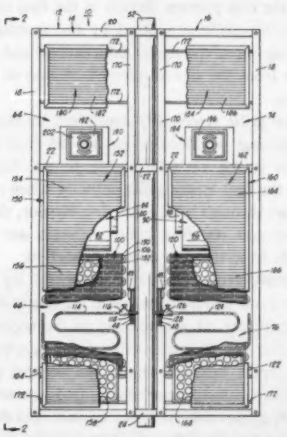
utilizing said energy in the form of heat to sustain the reversible endothermic chemical dissociation of ammonium carbamate to form carbon dioxide and ammonia;

providing heat energy for an end use by chemically exothermically recombining said carbon dioxide and ammonia to provide output energy requirements.

4,169,500
MODULAR AIR CONDITIONING APPARATUS

Alvin S. Braver, Oklahoma City, Okla., assignor to International Environmental Mfg. Co., Oklahoma City, Okla.

Continuation-in-part of Ser. No. 684,454, May 7, 1976, Pat. No. 4,127,162. This application Aug. 9, 1978, Ser. No. 932,274
Int. Cl.[2] F24F *3/08*
U.S. Cl. 165—50 5 Claims



1. An improved air conditioning apparatus of the type requiring connection to a source of heat transfer medium for providing simultaneous air conditioning to a first room area and to a second room area, the apparatus disposable between wall partitions or the like separating the first and second room areas and comprising:

a frame assembly comprising a first open box frame associ-

ated with the first room area and a second open box frame associated with the second room area, the first open box frame having three access sides and the second open box frame having three access sides;

a first mid-panel member having an opening therethrough and supported by the first open box frame so that the first mid-panel member separates the first open box frame into an upper first plenum section and a lower first operating section;

a second mid-panel member having an opening therethrough and supported by the second open box frame so that the second mid-panel member separates the second open box frame into an upper second plenum section and a lower second operating section;

a first blower supported by the first mid-panel member in the first operating section and disposed to blow air from the first operating section through the opening in the first mid-panel member into the first plenum section;

a second blower supported by the second mid-panel member in the second operating section and disposed to blow air from the second operating section through the opening in the second mid-panel member into the second plenum section;

a first heat exchanger supported on the first open box frame in the first operating section and positioned along a selected one of the access sides of the first open box frame;

a second heat exchanger supported on the second open box frame in the second operating section and positioned along a selected one of the access sides of the second open box frame;

first control means for sensing the temperature of the air in the first room area and for controlling the operation of the first blower in response thereto;

second control means for sensing the temperature of the air in the second room area and for controlling the operation of the second blower in response thereto;

a first outlet grille supported by the first open box frame along one of the access sides thereof and disposed to direct air from the first plenum section to the first room area;

a second outlet grille supported by the second open box frame along one of the access sides thereof and disposed to direct air from the second plenum section to the second room area;

a first intake grille removably supported by the first open box frame and positionable at the selected access side thereof in intake air relationship to the first heat exchanger, the first intake grille defining when removed an access port through which the first blower, the first heat exchanger and the first control means are selectively removable from the first operating section;

a second intake grille removably supported by the second open box frame and positionable at the selected access side thereof in intake air relationship to the second heat exchanger, the second intake grille defining when removed an access port through which the second blower, the second heat exchanger and the second control means are selectively removable from the second operating section;

supply means for providing fluid communication from the source of heat transfer medium to the first and second heat exchangers;

return means for providing fluid communication from the first and second heat exchangers to the source of heat transfer medium; and

condensate drain means for collecting and disposing of condensate from the first and second heat exchangers.

4,169,501

AIRFLOW REGULATING APPARATUS FOR RADIATOR

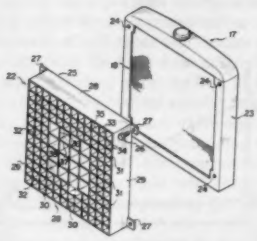
Sadatoshi Takeuchi, Kawasaki, and Osamu Kurihara, Yokohama, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Dec. 2, 1977, Ser. No. 857,187

Claims priority, application Japan, Dec. 2, 1976, 51-160435[U]

Int. Cl.[2] F28F *13/06*; B60K *11/04*; F01P *11/12*

U.S. Cl. 165—126 **5 Claims**



1. An airflow regulating apparatus for a radiator having a suction fan driven by an engine comprising a radiator core defining passages for a liquid coolant from the engine, a radiator grille mounted on a vehicle frame on the upstream side of said radiator core, and airflow regulating lattice means disposed between said radiator core and said radiator grille, said lattice means including a plurality of plates extending longitudinally and laterally parallel to the airflow, the density of said lattice means being low in and around the central part thereof and high at both side ends and upper and lower end regions thereof, whereby the density is in proportion to the speed of the air inflow to said lattice means so as to attain a uniform outflow speed of the airflow therefrom.

4,169,502

TUBULAR HEAT EXCHANGER

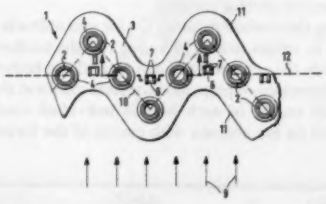
Erwin Kluck, Bad Nennhorf, Fed. Rep. of Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany

Filed Mar. 28, 1977, Ser. No. 781,553

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1976, 2613747

Int. Cl.[2] F28D *1.04*

U.S. Cl. 165—151 **6 Claims**



1. In a tubular heat exchanger comprising a plurality of tubes adapted to transport a liquid heat transfer medium between two collecting chambers, and a plurality of lamellar baffles arranged closely adjacent one to the other and supported by said tubes in substantially perpendicular relationship thereto, said baffles being adapted to intercept a gaseous heat transfer medium flowing past said tubes;

the improvement wherein all of said tubes are disposed such that, when viewed in cross section, their centers are arranged in series along a single first line which extends uniformly back and forth at least twice with respect to a substantially straight second line, each section of said first

line, which extends from one side to the other of said second line, passing through at least three tubes; and

wherein each of said baffles has longitudinal edges which include portions extending substantially parallel to said first line.

4,169,503

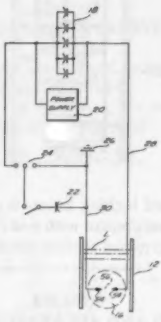
APPARATUS FOR GENERATING A SHOCK WAVE IN A WELL HOLE

Harold W. Scott, Ridgefield, Conn., assignor to Oil Recovery Corporation, Ridgefield, Conn.

Division of Ser. No. 502,661, Sep. 3, 1974, Pat. No. 4,074,758. This application Dec. 22, 1977, Ser. No. 863,434

Int. Cl.[2] E21B *43/25*

U.S. Cl. 166—65 R **1 Claim**



1. Apparatus for generating an electrohydraulic shock wave from a metallic well pipe in a liquid in a well hole in an oil bearing soil comprising:

capacitor electrical discharge means;

a shock wave generator including a pair of adjacent and opposed discharge electrodes forming a spark gap and connected to said capacitor electrical discharge means;

means for positioning the spark gap at a selected location in the well hole, said means including magnetic sensors for positioning the spark gap at an opening in the pipe; and

means for directing a shock wave in the liquid from the well hole and into the soil when an electrical discharge occurs between the electrodes.

4,169,504

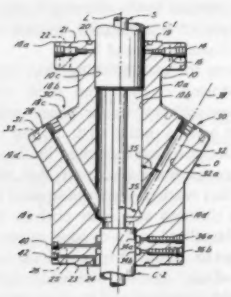
FLUID INTRODUCTION UNIT FOR WELLS

Raymond L. Scott, Houston, Tex., assignor to Wellhead Control Systems, Inc., Houston, Tex.

Filed Jan. 12, 1978, Ser. No. 868,792

Int. Cl.[2] E21B *33/03*

U.S. Cl. 166—90 **4 Claims**



1. A fluid introduction unit adapted for use in high pressure wells which require the introduction of corrosive fluids for well treatment purposes, comprising:

a fluid introduction housing adapted for mounting on a well production flow control assembly, said fluid introduction housing having a central housing bore extending longitudinally therethrough, said bore axis being coextensive with the longitudinal axis of said housing, said central housing bore being formed by a generally cylindrical wall and being adapted to receive production tubing which extends into the well;

said fluid introduction housing having an external mount means positioned radially outward with respect to the longitudinal axis of said housing, said external mount means being adapted to receive and mount flow control valving for the introduction of fluids into said housing;

said fluid introduction housing having a fluid introduction bore extending from said external mount means to said central housing bore at an inclined angle to the longitudinal axis of said central housing bore, said fluid introduction bore being oriented for tangential entry into the central housing bore whereby entering fluid is passed through said fluid introduction bore and enters said central housing bore tangentially to said central housing bore wall causing the fluid to flow helically downward thereby eliminating deleterious impingment of said entering fluid upon such production tubing positioned in said central housing bore.

4,169,505

KICK-OVER APPARATUS

William C. Neal, Rte. 2, Box 23-B, Houston, Tex. 70345

Filed Oct. 10, 1978, Ser. No. 950,121

Int. Cl.[2] E21B *7/06*

U.S. Cl. 166—117.5 **4 Claims**

1. A kick-over tool for installing or removing apparatus is sidepockets in gas-lift wells which comprises:

(a) an elongate body;

(b) a first pair of oppositely disposed, centering springs on said body and adapted to bow outwardly for contact with a tubing string on placing the tool in a tubing string;

(c) a second pair of similar centering springs which are arranged oppositely of one another along said elongate body and wherein said first and second pairs comprise four springs which are arranged at about ninety degree intervals around said elongate body;

(d) lock means immobilizing said kick-over tool against kick-over, said lock means incorporating a telescoping sleeve about said body which has a locking position and an unlocking position wherein the unlocking position permits said centering springs to extend through a set of openings in said sleeve and wherein said openings alter the flexure

of said springs between withdrawn or extended positions, said openings and said sleeve being constructed and arranged to releasably position said springs in the withdrawn or extended positions;

(e) means at the lower end of said elongate body adapted to be connected to an installation or retrieval tool; and

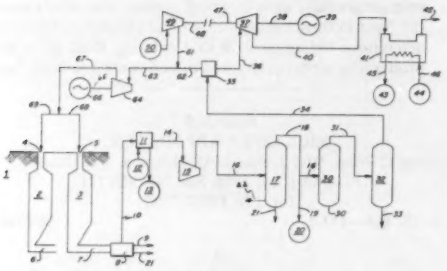
(f) separate anchor means for said first and second pair of centering springs to enable them to function as separate pairs and wherein they jointly, as pairs, flex outwardly toward the extended position and further wherein, on constraint, the remaining pair of centering springs is withdrawn.

4,169,506

IN SITU RETORTING OF OIL SHALE AND ENERGY RECOVERY

Kay L. Berry, Denver, Colo., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Jul. 15, 1977, Ser. No. 815,994
Int. Cl.[2] E21B *43/24;* E21C *41/10*
U.S. Cl. 166—256 **10 Claims**



7. A process for energy recovery from combustion off gases from an in situ oil shale retorting, comprising:

passing the off gases to a dedusting zone wherein the concentration of dust in the off gases is reduced to less than about one grain per cubic foot;

passing the off gases to a deoiling zone wherein the concentration of oil in the off gases is reduced to less than about 500 ppm by compressing the off gases to a pressure in excess of about 150 psig so that oil and light condensable hydrocarbons are condensed, and then removing the condensed oil and hydrocarbons from the off gases; and

passing the off gases to a desulfurization zone wherein the concentration of sulfur in the off gases is reduced to less than about 10 ppm;

passing the purified off gases to a power generation zone wherein said gases are burned and power generated in a gas turbine.

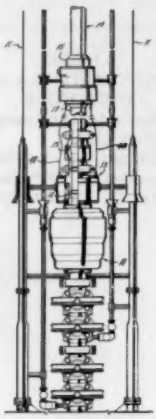
4,169,507

UNDERWATER WELL APPARATUS

Edward J. Szymczak, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.

Continuation of Ser. No. 832,062, Sep. 12, 1977, abandoned. This application Jun. 5, 1978, Ser. No. 912,474
Int. Cl.[2] E21B *43/01;* F16L *35/00*
U.S. Cl. 166—340 **18 Claims**

1. Underwater well apparatus, comprising a riser pipe having means for releasably locking its lower end to the upper end of underwater wellhead, said locking means including locking parts movable between locking and releasing positions with respect to a locking part on the wellhead, and a fluid responsive operator for so moving said locking parts, said riser pipe including upper and lower telescoping pipe sections, and means for holding the pipe sections in retracted position, said holding means being severable, in response to the application of a predetermined tension to the riser pipe, to release the upper pipe section for movement to extended position, and means for fluidly actuating said operator to release said movable locking parts in response to extension of said upper pipe



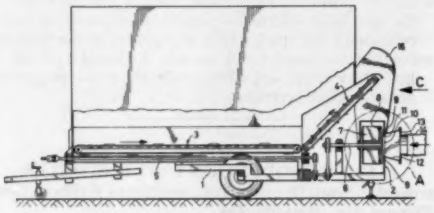
section whereby said locking means is permitted to be raised from the wellhead equipment with said riser pipe upon application of said predetermined tension thereto.

4,169,508

METHOD AND APPARATUS FOR FIRE EXTINGUISHING

Ensi A. Jauros, Helsinki, and Tapani M. Ojala, Karhula, both of Finland, assignors to A. Ahlstrom Osakeyhtio, Noormarkku, Finland

Filed Oct. 25, 1977, Ser. No. 845,353
Int. Cl.[2] A62C *1/08, 27/00*
U.S. Cl. 169—47 **5 Claims**



1. A method for extinguishing fires burning on a liquid, which comprises introducing comminuted mineral wool into an airstream for carrying thereby in admixture therewith; and directing said airstream to the burning liquid to deposit upon said liquid a layer of comminuted mineral wool that extinguishes the fire burning on said liquid.

3. An apparatus for extinguishing fires which comprises a container for storing comminuted solid, fire extinguishing material; a blower with a rotary impeller within a casing having an inlet port and an outlet port; cutting means positioned adjacent said inlet port and including knife parts mounted on said casing and cooperating knife parts mounted on said impeller for rotation therewith to comminute solid fire extinguishing material drawn through said inlet port by suction from the rotation of the impeller, outlet conduit means flow connected to said outlet port to receive therefrom an airstream established by the rotation of said impeller; and feeder conduit means flow connected to said container and to said outlet conduit means; said outlet conduit means having an outlet end selectively movable to a first position to discharge toward a fire to be

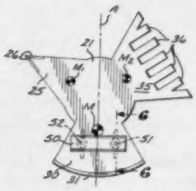
extinguished and to a second position to discharge into said container, whereby in one mode of operation, comminuted fire extinguishing material flows from the container through the feeder conduit means into the outlet conduit means for admixture with the airstream and conveyance thereby for discharge toward a fire with said outlet end of the outlet conduit means in said first position, and in a second mode of operation fire extinguishing material drawn through said inlet port is comminuted by the cutting means, introduced into the airstream and conveyed thereby for discharge toward a fire with said outlet end of the outlet conduit means in said first position, and in a third mode of operation comminuted fire extinguishing material drawn through said inlet port is conveyed by the airstream and discharged into the container, with said outlet end of the outlet conduit means in said second position.

4,169,509

COMBINATION GARDEN TOOL WITH REMOVABLE WEIGHT

Carl W. Lowman, Costa Mesa, Calif., assignor to Alpha Nova Engineering Corp., Santa Ana, Calif.

Filed Mar. 3, 1978, Ser. No. 883,318
Int. Cl.[2] A01B *1/20*
U.S. Cl. 172—375 **3 Claims**



1. A combination garden tool comprising:
a tubular mount;
handle means attached to one end of said mount;
an end plate attached to the other end of said mount, said end plate including a central disc extending orthogonally relative to said mount shaped in planform around the periphery thereof, said end plate further including a triangular Warren hoe extending from said disc with the apex thereof aligned radially distal of said disc, a triangularly shaped rake extending in a radial fan out from said disc and deploying a plurality of fingers at the free edge thereof, and a triangularly shaped hoe blade extending from said disc having a base conformed as a circular edge segment radially distal of said disc, said Warren hoe, said rake and said hoe blade being spaced at substantially equal increments of arc around the periphery of said disc; and
a removable weight spaced inwardly from said circular edge and of sufficient mass to substantially change the position of the center of mass of said end plate when attached thereto, said weight selectively secured directly to a surface of said hoe blade and spaced radially outwardly from said tubular mount for providing a weight bias for said hoe blade.

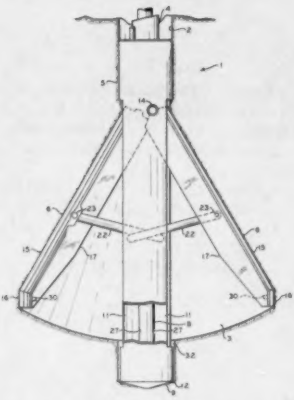
4,169,510

DRILLING AND BELLING APPARATUS

Robert W. Meigs, Stavanger, Norway, assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 16, 1977, Ser. No. 825,015
Int. Cl.[2] E21B *9/26*
U.S. Cl. 175—65 **8 Claims**

1. A belling drill including:
a frame having at a lower end thereof a first drill portion and having a recess in an outer surface of a side wall of the frame, said frame having a portion defining a first flow path;
at least one belling arm pivotally carried by said frame and having a second drill portion adapted for drilling an enlarged chamber in a drill hole, said belling arm being selectively movable between a retracted non-drilling position in said recess and an extended drilling position;
first means cooperating with said belling arm and operable for selectively moving said belling arm between said non-drilling position and said drilling position;
a tubular member positioned inside said frame and extending longitudinally along said frame, said tubular member defining a second flow path and having an open end adjacent the first drill portion for providing flow communication between said first and second flow paths, said tubular member having an elongate side wall with a through opening forming a third flow path between the interior and exterior of the tubular member for providing flow communication between said first and second flow paths; and
valve means operably associated with said belling arm operable for closing said opening when said belling arm is in said non-drilling position for at least substantially preventing flow communication between said first and second flow paths through said opening.

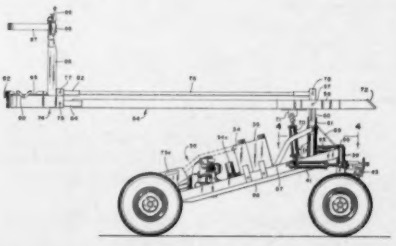


4,169,511

BOOM-PULPIT VEHICLE

Philip A. Brown, 4689 - 8 Mile Rd. NW., Conklin, Mich. 49403

Filed Mar. 20, 1978, Ser. No. 888,355
Int. Cl.[2] B66F *11/04*
U.S. Cl. 180—212 **2 Claims**



1. A boom pulpit vehicle having a frame, a pair of coaxial spaced support wheels rotatably mounted on said frame, a third support wheel rotatably mounted on said frame at a position laterally spaced from the axis of said pair of wheels, said third wheel being moveable about a vertical axis for steering, said vehicle also having differential drive means for said pair of wheels, and a boom pulpit mounted on said frame for

pivotal movement about vertical and horizontal axes for elevation and azimuth positioning, wherein the improvement comprises:

bearing means on said frame disposed on a substantially vertical axis, and constituting the vertical axis pivot for said boom pulpit, said bearing means being adjacent said third wheel vertical axis; and

drive means for said third wheel, said boom pulpit including means operable to control said drive means and the position of said boom pulpit in azmith and elevation, and said boom pulpit further including an operator's platform and balancing weight-receiving means on the opposite side of the horizontal axis pivot of said boom pulpit from said operator's platform.

4,169,512

POWER UNIT SWINGING TYPE MOTOR CYCLES

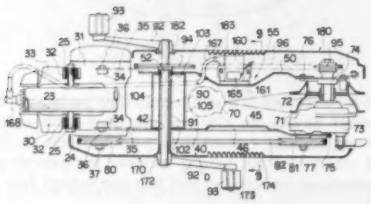
Masaru Ishikawa, Higashi-Murayama; Nagatoshi Katagiri, Asaka; Shigenaga Enoki, Wako, and Kozo Ohta, Sayama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 25, 1977, Ser. No. 800,172

Claims priority, application Japan, Jun. 1, 1976, 51-70430[U]; Jun. 1, 1976, 51-70432[U]; Jun. 1, 1976, 51-70433[U]; Jun. 2, 1976, 51-71031[U]; Jun. 2, 1976, 51-71032[U]

Int. Cl.[2] **B62K** *25/10*

U.S. Cl. 180—205 **17 Claims**



1. A motorcycle, comprising:

a body frame;

an engine swingably hung on said body frame;

a pair of right and left plates forming a rear fork connected in the front end portions thereof to said engine;

a rear wheel axle supported between the rear end portions of said pair of right and left plates;

power transmitting means for transmitting power from said engine to said rear wheel axle;

shock absorbers connected between said body frame and said pair of right and left plates whereby said engine, said rear fork, said rear wheel axle, and said power transmitting means swing as a unit relative to said body frame of said motorcycle;

a concavity made in their intermediate portion of one of said rear fork plates; and

an ignition coil housed and secured in said concavity.

4,169,513

SIGNAL ACTUATING DEVICE

Thomas M. Sagaser, Gwinner, and Dale P. Bodine, Lisbon, both of N. Dak., assignors to Clark Equipment Company, Buchanan, Mich.

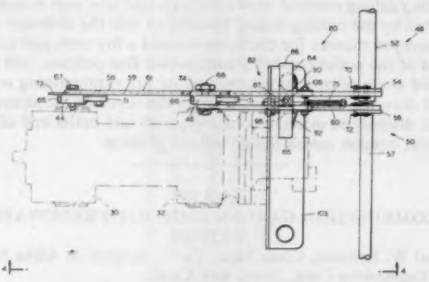
Filed Mar. 24, 1978, Ser. No. 889,784

Int. Cl.[2] **B60K** *28/00*

U.S. Cl. 180—271 **14 Claims**

1. In a vehicle of the type having first and second rotary propelling elements that are proximal to opposite sides of said vehicle, having a source of power, having means for supplying said power to said propelling elements, and having first and second manual control devices that are connected to said power supplying means, and that control the direction of rotation and the rotational speed of respective ones of said rotary propelling elements in response to the direction of movement and magnitude of movement of manual control signals applied to respective ones of said manual control devices, the improvement which comprises:

a mechanically actuated signalling switch being mechanically attached to said vehicle; and



switch actuator means for receiving mechanical motion from both of said manual control devices, and for actuating said switch as a function of the sum of said magnitudes of movement when both of said movements are in the same direction.

4,169,514

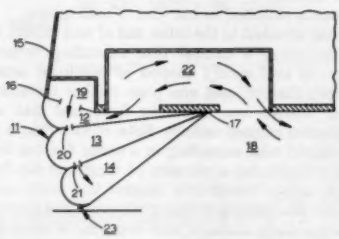
AIR CUSHION VEHICLES

Raymond L. Wheeler, East Cowes; Kay Rollins, Ryde, and Brian G. Clarke, Niton, all of England, assignors to British Hovercraft Corporation Limited, Yeovil, England United Kingdom

Filed Mar. 2, 1978, Ser. No. 882,908

Int. Cl.[2] **B60V** *1/16*

U.S. Cl. 180—127 **4 Claims**



1. In an air cushion vehicle comprising a rigid body structure, means for forming an air cushion beneath said rigid structure including cushion sealing means attached to and extending downwardly from the rigid body structure for minimizing lateral escape of air from the cushion, the cushion sealing means attached to and extending downwardly from the rear of the vehicle comprising a skirt of flexible impermeable sheet material, said skirt having an outer part of corrugated form in vertical cross section, said outer part having the upper edge attached to the rigid body structure, a diaphragm member extending from each cushion facing peak of the corrugations inwardly and upwardly to attachment at the underside of the rigid body structure so as to form a plurality of inflatable compartments positioned one above the other, and means associated with the diaphragms for providing communication between the compartments, the improvement comprising means for inflating the compartments and for regulating the air pressure within the compartments and the air cushion, said last named means including first duct means formed in said rigid body structure of the vehicle and forming communication from a source of pressurized air on the vehicle and the interior of the skirt for inflating the compartments of the skirt, and

second duct means formed in the rigid body structure of the vehicle and forming unrestricted communication between the interior of the skirt and the air cushion beneath said rigid structure, said second duct means having a total cross sectional area considerably larger than the total cross sectional area of the first duct means whereby during operation said first duct means provides pressurized air for inflating said skirt and said second duct means provides for unrestricted flow of air from the interior of the skirt to the air cushion when the skirt is deflected thereby preventing a substantial rise in the skirt inflation pressure and whereby air may be transferred through the second duct means from the air cushion to the interior of the skirt to increase the skirt inflation pressure when the air cushion pressure increases.

4,169,515

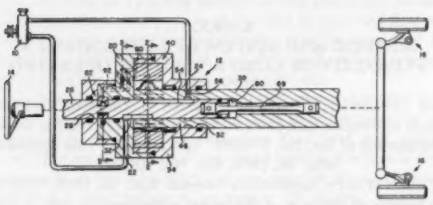
POWER STEERING DEVICE

Rex W. Presley, Livonia, Mich., assignor to The Bendix Corporation, Southfield, Mich.

Filed Feb. 23, 1978, Ser. No. 880,402

Int. Cl.[2] B62D *5/08*

U.S. Cl. 180—149 **9 Claims**



1. In a power steering vehicle device having an input member coupled to a steering wheel, an output member coupled to a steering linkage and a housing for rotationally supporting the input member and the output member and communicating with a pressure source, the improvement wherein said output member includes means which cooperate with said housing to form a plurality of pressure chambers, said input member and said output member cooperating to communicate the pressure source with the plurality of pressure chambers via an arcuate cavity formed between said input member and said output member, said input member being rotatable relative to said output member to control communication to the plurality of pressure chambers, and said member including radial passages extending from said arcuate cavity to said plurality of pressure chambers for opening communication therebetween.

4,169,516

SPEAKER SYSTEM

Ichiro Honda, No. 3-2-25, Ohgigaya, Kamakura City, Kanagawa-Ken, Japan

Filed Apr. 25, 1977, Ser. No. 790,695

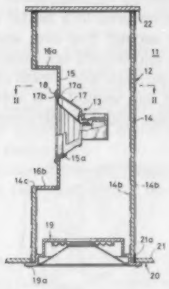
Claims priority, application Japan, Apr. 26, 1976, 51-51306; Apr. 26, 1976, 51-51307; Apr. 26, 1976, 51-51308; Jun. 15, 1976, 51-77055

Int. Cl.[2] H05K *5/00*

U.S. Cl. 181—153 **1 Claim**

1. A speaker system comprising: a cylindrical enclosure having a cylindrical side wall, said side wall being provided with at least one opening; at least one speaker; and means for supporting and attaching the speaker to the enclosure whereby the speaker is disposed in the enclosure through the opening and a front surface of the speaker faces outside, said supporting means comprising:

a member for supporting the speaker whereby a front portion of the speaker projects from the side wall of the enclosure through the opening, said enclosure being formed of a cardboard wound spirally in a cylindrical shape to define a paper pipe, said paper pipe being coated



by a paint layer over its surface both externally and internally.

4,169,517

DEVICE SERVING THE NOISE CONTROL OF SOUND ENERGY RADIATED FROM THE JET ENGINES OF AN AIRCRAFT OPERATED ON THE GROUND IN STATIONARY POSITION

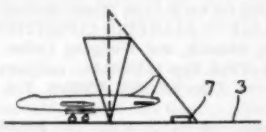
Thomas J. Meyer-Bretschneider, Holztwiete 8, D 2 Hamburg 52, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 550,683, Feb. 18, 1975, abandoned. This application Jan. 25, 1977, Ser. No. 762,306

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1976, 2604183

Int. Cl.[2] F01N *1/00*

U.S. Cl. 181—210 **13 Claims**



1. In a sound attenuating housing for enclosing at least a portion of an aircraft having an engine operated on the ground in a stationary position so as to provide a shield for attenuating noise and controlling sound energy radiating from said aircraft, the combination comprising at least two inclined shielding wall members forming a housing having a large opening for permitting entry of said aircraft, said wall members inclined toward one another and leaning against each other so as to provide a shield for attenuating noise and controlling sound energy from said aircraft, at least a portion of the weight of said shielding wall members tending to press said shielding wall members toward one another, and means forming an opening arranged in said housing for discharging gases from said aircraft, whereby said aircraft engine may be oriented with respect to said opening to transmit engine exhaust gases therethrough, and wherein at least a portion of the force of said exhaust gases is exerted upon said inclined shielding wall members in opposition to said weight, said shielding wall members for an intersection which is angularly inclined upwardly from said opening for discharging exhaust gases to said larger opening.

4,169,518

SAFETY BELT

Raymond Schmoock, 94 Beach Rd., Carmel, N.Y. 10512

Filed Oct. 17, 1977, Ser. No. 842,478

Int. Cl.[2] A62B *35/00*; E06C *5/36*; A62B *1/16*

U.S. Cl. 182—8 **3 Claims**

1. A safety belt adapted to be worn for preventing the fall of

a person from a ladder or when ascending and descending a ladder comprising first belt means for fitting around the waist of a person, said first belt being adjustably securable to itself to increase and decrease the circumference thereof, second belt means adapted to be secured to a ladder and terminating in a first free end and a second free end, said second belt being adjustable in length, said second belt means slidably secured to said first belt means through loop means extending around said first belt means and said second belt means said loop means adapted to slidably pass said first belt therethrough completely

from end to end and to pass said second belt substantially therethrough, ladder rung engaging means extending from each of said free ends, receiving means on said first belt for holding said ladder rung engaging means thereto whereby when said safety belt is worn and used by a person on a ladder and secured to said ladder through said rung engaging means, said person can alternately reach to the left or right of said ladder and slidably move said first belt towards either of said free ends without adjusting the length of said second belt and remain securely held to said ladder.

4,169,519

LUBRICATING DEVICE FOR TRANSMISSIONS OR THE LIKE IN STARTING CONDITION

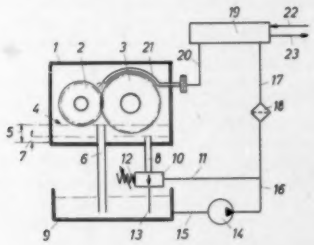
Manfred Hirt, Munich, and Wolfgang Leiber, Oberweikertshofen, both of Fed. Rep. of Germany, assignors to Carl Hurth Maschinen-und Zahnradfabrik, Munich, Fed. Rep. of Germany

Filed Feb. 24, 1978, Ser. No. 880,900

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1977, 2715771

Int. Cl.[2] F01M *9/00*

U.S. Cl. 184—6.3 **4 Claims**



1. A lubricating device for lubricating gears in a transmission housing during an initial starting condition phase of operation thereof, said lubricating device comprising:

a storage tank housing lubricant therein;

an oil pump having an inlet port and an outlet port, said inlet port being connected in fluid circuit with said storage tank;

a normally closed pressure responsive valve having control means responsive to a fluid pressure from said pump above a predetermined threshold value to effect an opening of said valve, said control means being connected in fluid circuit with said outlet port;

sump means in said transmission housing;

a first overflow pipe connecting said sump means to said storage tank and including first means establishing an upper lubricant level into which at least one gear is rotated;

a second overflow pipe connecting said sump means to said storage tank and including second means establishing a lower lubricant level below the level of said one gear;

third means connecting said outlet port to a further location adjacent said one gear in said transmission housing, said pump effecting a pumping of said lubricant from said storage tank into said transmission housing to effect a pressurized spray of lubricant onto said one gear; and

said pressure responsive valve being connected in line of said second overflow pipe, said valve becoming opened in response to a fluid pressure from said outlet port of said pump attaining and exceeding said predetermined threshold value to effect a connection between said sump and said storage tank to cause a lowering of the level of lubricant in said transmission housing to said lower lubricant level.

4,169,520

METHOD AND SYSTEM OF LUBRICATING A PLURALITY OF COMPRESSED AIR OPERATED DEVICES

Josef Lewkowicz, Ektorp, and Torsten O. Larsson, Karlskoga, both of Sweden, assignors to Atlas Copco AB, Nacka, Sweden

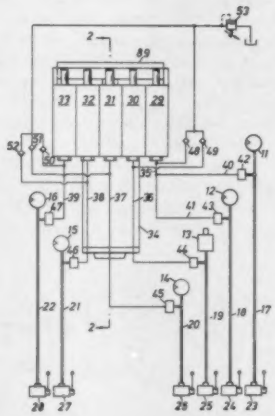
Continuation of Ser. No. 678,981, Apr. 21, 1976. This application May 18, 1978, Ser. No. 906,997

Claims priority, application Sweden, Apr. 24, 1975, 7504760

The portion of the term of this patent subsequent to Apr. 3, 1996, has been disclaimed.

Int. Cl.[2] F16N *13/22, 25/00, 7/32*

U.S. Cl. 184—7 D **8 Claims**



1. Method of lubricating a plurality of compressed air consuming devices that are independently supplied with compressed air through supply lines controlled by supply valves, the method comprising:

supplying metered flows of lubricant to lubricant supply lines by means of positive displacement pumps, the supply lines being provided with normally closed shut-off valves and leading to the respective air consuming device, the metered flows of lubricant being constantly supplied and kept flowing even when the shut-off valves are closed,

operating the positive displacement pumps in synchronism with one another,

sensing the air pressure in the air lines downstream of the supply valves,

opening the respective shut-off valve in response to the sensed presence of the air pressure in the respective air line being pressurized, and

providing pressure relief valves (48–52) in said lubricant supply lines (36–39, 40, 41) to permit the metered flows of lubricant in the lubricant supply lines to escape when the respective shut-off valves are closed, to thereby keep the metered flow of lubricant constantly flowing.

4,169,521
SINGLE-STOP SHOPPING FACILITY KIT

Michael M. Vayda, Jr., 1600 S. Joyce St., Arlington, Va. 22202

Division of Ser. No. 716,374, Aug. 23, 1976, Pat. No. 4,111,282.
This application Mar. 3, 1978, Ser. No. 882,982
The portion of the term of this patent subsequent to Sep. 5, 1995, has been disclaimed.
Int. Cl.[2] E04H *3/04*
U.S. Cl. 186—1 C **6 Claims**

1. A kit for conversion of an automobile service station into a drive-in, single-stop shopping facility for vending retail products and fuel to customers seated in first and second automobiles, said kit having component parts capable of being assembled in the field at a service station having means for housing the retail products and personnel for said facility and first and second dispensing means operable by a ramp attendant for respectively delivering fuel to said first and second automobiles, said kit comprising the combination of:

(a) first and second purchase selection means adapted to be mounted at said service station so as to be operable by said customers respectively seated in said first and second automobiles, each of said purchase selection means including: means for informing the customer of the selection of fuel and retail products for sale at the facility; means for communicating the customer's fuel purchase selection to said ramp attendant; and means for communicating the customer's retail product selections to a cashier and order clerk within said housing means;

(b) first and second payment means adapted to be mounted at said service station so as to be operable by said customers respectively seated in said first and second automobiles and by said cashier, each of said payment means including means for the customer to pay for the total cost of the customer's retail product and fuel order;

(c) means adapted to be mounted on said housing means so as to be operable by said order clerk for passing the customer's respective retail product orders from within said housing means to the outside thereof for delivery to the customers' automobiles; means (a) through (c) being adapted to be operatively associated so that, when said kit is assembled in the field to convert a service station to said facility, both customer's respective retail product and fuel purchases can be accomplished independently of each other and during the same time frame, whereby customers respectively seated in said first and second automobiles can be served retail products and fuel at the facility at the same time.

4,169,522
SKIP BRAKE UNITS

Stanley E. Highland, 316 Willington Ave., Chilliwack, British Columbia, Canada (V2P 2E4)

Filed Feb. 13, 1978, Ser. No. 877,069
Int. Cl.[2] B61H *9/02*
U.S. Cl. 188—65.2 **7 Claims**

1. A brake unit for skips or the like travelling on cables comprising:

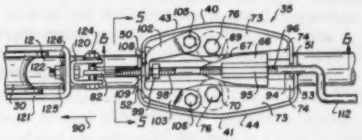
a pair of elongate substantially parallel and opposed brake members,

handles at outer edges of the brake members and brake jaws at inner edges thereof, movement of said handles towards each other moving said jaws away from each other to receive a cable extending longitudinally therebetween, and movement of the handles away from each other moving the jaws towards each other to grip said cable in a braking operation,

opposed bearings on said handles between the brake members,

a wedge-shaped spreader plate between the brake members and mounted for movement in a first direction in a plane extending across said members to engage said bearings and spread the handles apart and for movement in an opposite second direction to allow said handles to be moved towards each other,

pivot means interconnecting the brake members between said handles and said inner edges, said pivot means comprising a tubular guide carried by said brake members parallel to said plane, and a guide pin for and connected to said spreader plate and riding in said tubular guide, and



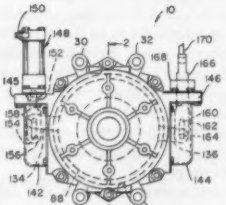
an operator bar having one end connected to said spreader plate and an opposite outer end extending outwardly from the brake members and adapted to be connected to a skip riding on said cable,

whereby movement of the skip along the cable in the direction away from the brake members moves said spreader plate by means of said bar in said first direction to spread the handles apart to cause the brake jaws to grip the cable and movement of the skip in the direction towards the brake members moves the spreader plate in said second direction to allow the handles to move towards each other to reduce the grip of the brake jaws on the cable.

4,169,523
DISC BRAKE

Eugene F. Malinowski, Milford, and Casimir Klimkowski, Warren, both of Mich., assignors to D.A.B. Industries, Inc., Troy, Mich.

Filed Jan. 23, 1978, Ser. No. 871,191
Int. Cl.[2] F16D *55/06*
U.S. Cl. 188—71.4 **4 Claims**



1. A disc brake comprising a housing, a shaft journaled in said housing for rotation, a series of brake discs encircling said shaft in said housing having alternately arranged first and second brake discs, said first discs being keyed to said shaft for longitudinal movement and for rotation therewith, said second discs being non-rotatably keyed to said housing for longitudinal movement, an annular piston encircling said shaft and non-rotatably keyed to said housing at one side of said series of brake discs for longitudinal movement, an annular rotatable actuator encircling said shaft at the side of said piston opposite said series of brake discs, registering ramps on the opposing

faces of said actuator and said piston, roller means engaging said registering ramps so that rotation of said actuator in one direction will shift said piston toward said series of brake discs and cause braking engagement of said discs, means for rotating said actuator in said one direction comprising a hydraulic assembly and a mechanical assembly, said housing having a first extension mounting said hydraulic assembly on one side thereof and a second extension mounting said mechanical assembly on the opposite side thereof, each assembly having a reciprocable operator, said actuator having radially outward projections on diametrically opposite sides thereof extending through said housing, and lost-motion pin and slot connections between operators and said respective projections, so that said actuator may be rotated in said one direction by either assembly through one of said lost-motion connections by movement of its operator in an operating direction, the pin of each lost-motion connection being at one end of its slot so as to transfer motion to said slot without lost motion when its operator moves in said operating direction and so as to move with lost motion in its slot when the other operator moves in said operating direction.

4,169,524

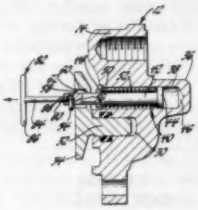
DISC BRAKE SERVICE PISTON RETURN SPRING GUIDE PIN REMOVAL

Natabara Khuntia, Hudson, and Charles W. Rader, Willowick, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 29, 1978, Ser. No. 920,264

Int. Cl.[2] F16D *55/40*

U.S. Cl. 188—170 **1 Claim**



1. In a disc brake having a housing, an annular pressure chamber formed in said housing, circumferentially spaced bores for piston retracting mechanisms formed in said housing, an annular piston sealingly and reciprocably mounted in said annular pressure chamber for brake actuation by pressure introduced into said chamber, said piston having circumferentially spaced stepped holes in axial alignment with said circumferentially spaced bores and having shoulders therein, and piston retracting mechanisms in each of said bores and holes, each of said piston retracting mechanisms including a return spring guide pin having a head on one end in one end of one of said bores, a compression piston return spring having one end engaging said guide pin head and the other end engaging a bore cover secured to said housing, said guide pin extending into one of said piston circumferentially spaced stepped holes, the improvement comprising:

a tapped hole extending axially in the other end of said return spring guide pin, a single cross passage extending through said guide pin adjacent to said tapped hole and located in said piston stepped hole, and a cross pin in said cross passage of greater length than the diameter of said guide pin and normally engaging said shoulder of said stepped hole and transferring piston retracting force exerted by said spring to urge retraction of said piston and for preventing the removal thereof from said annular chamber,

and removal tool means having an attachment portion selectively threadable into one of said tapped holes and a force imparting portion for exerting an axial force on one of said guide pins at a time to compress said piston return spring sufficiently to expose said cross pin by extending it axially out of said stepped hole so that the cross pin can be removed, said selectively threaded means then being movable to each of said retracting mechanisms in turn until all of said cross pins have been removed from said spring guide pins, after which said piston can be removed from said annular chamber.

4,169,525

FRICTION BRAKE APPARATUS AND SLACK ADJUSTING MEANS THEREFOR

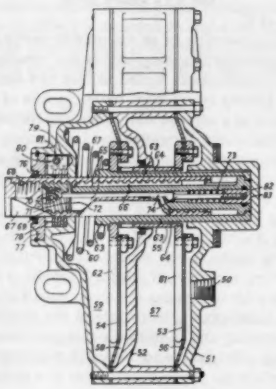
Geoffrey R. Tregoning, London, England, assignor to Westinghouse Brake & Signal Co. Ltd., London, England

Filed Oct. 11, 1977, Ser. No. 840,816

Claims priority, application United Kingdom, Oct. 9, 1976, 42067/76

Int. Cl.[2] F16D *65/56*

U.S. Cl. 188—196 D **21 Claims**



20. Friction brake apparatus comprising a brake force applying member, a brake force actuator to effect an application of the brakes upon an outward actuator stroke and to effect release of the brakes upon a return actuator stroke, slack adjusting means coupled to the brake force actuator to permit full stroke return of the actuator, and a linkage intercoupling the slack adjusting means and the brake force applying member, said linkage including:

(a) a one-way clutch to resist, when effective, return movement of the brake force applying member, the said one-way clutch comprising a heavy rate helical spring member which frictionally engages co-operating hub portions of two arms mutually pivoted about the axis of the helical spring member; and

(b) means to permit return movement of the brake force applying member for a predetermined distance before the one-way clutch becomes effective to resist further such return movement.

4,169,526

TORQUE CONVERTER AND TORQUE RESPONSIVE SLIPPING CLUTCH

John D. Malloy, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

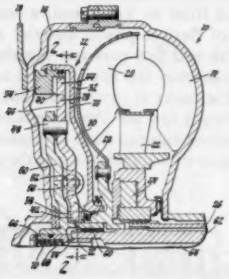
Filed Jan. 25, 1978, Ser. No. 872,048

Int. Cl.[2] F16D *39/00, 47/06*

U.S. Cl. 192—3.3 **2 Claims**

1. A torque converter and slipping clutch comprising; an input shell adapted to be driven by a power source; torque converter means having an impeller, driven by said input shell, and a turbine; clutch means, disposed between said input shell and said turbine, being responsive to fluid pressure on opposite sides thereof for controlled frictional engagement with said

input shell; output means for delivering power from said torque converter means and clutch means; lever means pivotally mounted on said output means and being drivingly connected with said clutch means and said torque converter means for transmitting torque to said output means from said clutch means and said torque converter means; and valve means



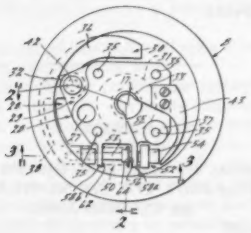
responsive to the ratio of torque transmitted by said clutch means and said torque converter means through said lever means for controlling the exhausting of fluid pressure from one side of said clutch means to maintain the engagement of said clutch means such that the torque transmitted by said clutch means is at a predetermined proportion of the total torque transmitted to said output means.

4,169,527

FRICTION FAN CLUTCH

Warren G. Bopp, Farmington, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Aug. 9, 1977, Ser. No. 823,234
Int. Cl.[2] F16D *43/25, 13/18*
U.S. Cl. 192—82 T **9 Claims**



1. A clutch adapted to be interposed between a driven shaft means and a load means, said clutch comprising:

a first clutch member adapted to be secured to one of said means for rotation therewith and defining a substantially V shaped first, arcuate, radially inwardly facing friction clutching surface;

a second clutch member adapted to be secured to the other of said means, and mounted for coaxial rotation relative to said first clutch member and including a portion defining a substantially V shaped second, arcuate, radially outwardly facing friction clutching surface complimentarily disposed radially inwardly of said first surface, the V shapes defined by said first and second friction clutching surfaces comprising legs which are converging in the radially outward direction; and

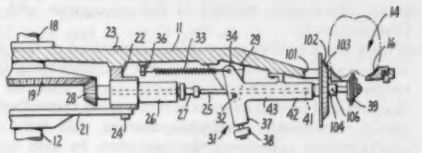
means operative to rotatively mount one end of said portion at a point radially intermediate the axis of said shaft means and said first clutch member for pivotal movement between a first position in which said clutching surfaces are engaged and a second position in which said clutching surfaces are disengaged.

4,169,528

APPLE ORIENTING SYSTEM

John H. Amstad, Alameda, Calif., assignor to Atlas Pacific Engineering Company, Emeryville, Calif.

Filed Dec. 12, 1977, Ser. No. 859,876
Int. Cl.[2] B65G *47/24*
U.S. Cl. 198—385 **5 Claims**



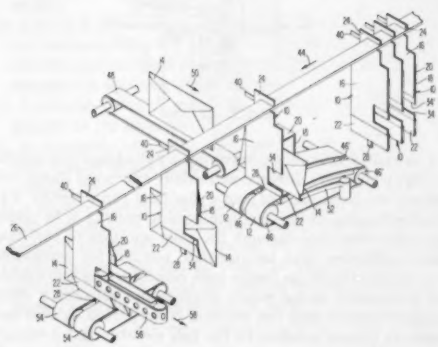
1. An apple orientor comprising a support movable over a path in a horizontal plane, at least one receptacle in said support having an open bottom and a frusto-conical side wall, means mounting said receptacle on said support for movement with respect to said plane, a shaft rotatably mounted on the underside of said support and extending to a position below the opening in said receptacle, a plurality of wheels each mounted eccentrically on said shaft for rotating in a first vertical plane in said open bottom to rotate an unoriented fruit positioned in said receptacle, another wheel mounted upon said shaft for rotation adjacent the outer upper edge of the receptacle to engage a fruit in said receptacle.

4,169,529

ITEM TRANSPORT APPARATUS COMPRISING A VARIABLE THICKNESS CARRIER DEVICE

James R. Hunter, Chadds Ford, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed Feb. 27, 1978, Ser. No. 881,241
Int. Cl.[2] B65G *37/00*
U.S. Cl. 198—473 **10 Claims**



1. Apparatus including transport means for transporting items including mail pieces comprising:

carrier means;

said carrier means having a fixed side member, a movable side member and a pair of support sections;

said fixed side member having a hanger-like element at one extremity thereof for engaging said transport means;

a first pair of hinge means coupling a first of said support sections respectively to said fixed side member and one extremity of said movable side member;

a second pair of hinge means coupling the second of said support sections respectively to the other opposite extremities of both said fixed side member and said movable side member, said second of said support sections being comprised of a plurality of slats connected to one another along their lengths by flexible material;

said first and second pair of hinge means being operatively disposed on said carrier means for enabling the latter to selectively assume at least a fully closed and a fully open configuration;

said fully closed configuration being comprised of said fixed side member and said second of said support sections lying substantially in a first plane, and said movable side member and said first of said support sections lying in a second plane substantially parallel to and contiguous with said first plane;

said fully open configuration being comprised of said fixed side member and said movable side member lying in respective parallel planes and being spaced apart by said first and said second support sections lying respectively in planes substantially transverse thereto, said fully open configuration permitting the reception by said carrier means of said items to be transported;

said carrier means assuming a configuration intermediate said fully open and said fully closed configuration when transporting said items, the geometries of the intermediate configurations varying as a function of the thickness and contour of said items.

4,169,530

PULLEY ASSEMBLIES

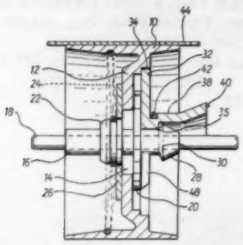
Leslie A. Fryatt, Accrington, England, assignor to J. H. Fenner & Co. Limited, North Humberside, England

Filed Apr. 26, 1978, Ser. No. 900,370

Claims priority, application United Kingdom, Apr. 29, 1977, 17927/77

Int. Cl.[2] B65G *23/04*

U.S. Cl. 198—835 **12 Claims**



1. A pulley assembly comprising a cylindrical rim member, a radially inwardly directed and axially apertured flange intermediate the axial ends of said cylindrical rim member, a hub member having an intermediate portion passing with substantial radial clearance through the axial aperture of the flange, means adjoining said intermediate portion for constraining axial movement of the flange with respect to the hub member, and retractable spoke means displaceable between a normal position wherein said rim member is supported by said spoke means in coaxial relation to the hub member and a retracted position wherein that support is removed and said rim member undergoes a radial displacement causing its flange to engage directly on the hub member.

4,169,531

PLASTIC CONTAINER WITH INDIVIDUAL PRODUCT POCKETS

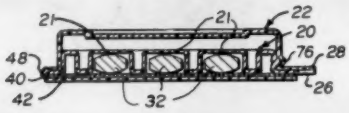
Clifford A. Wood, Pound Ridge, N.Y., assignor to Packaging Components Industries, Inc., Roslyn Heights, N.Y.

Filed Aug. 18, 1977, Ser. No. 825,727

Int. Cl.[2] B65D *83/04*

U.S. Cl. 206—531 **9 Claims**

1. A package for a plurality of products including in combination a first part made of flexible plastic material constituting a main panel with rows of sockets therein of one-piece construction with the rest of the main panel and with a mouth of each socket at the lower end thereof and opening through a bottom surface of the main panel and facing outward at the bottom of the package when the package is closed, each of the sockets being collapsible by finger pressure against an upper end thereof to dislodge a product in the socket out through the mouth of the collapsed socket, the main panel having an upstanding ridge that forms a side wall thereof beyond the area in which the sockets are located, the side wall having a rim extending outward from its lower end, a second part of the package made of flexible plastic material and of one-piece construction with said first part and constituting an integral cover that extends over the upper closed ends of all of the sockets when the cover is closed, and the cover having a clearance between it and the closed ends of the sockets for holding printed directions and other information relating to the products in the sockets and their use, and the cover having side



walls extending downward to a level at which they overlap the upstanding ridge of the main panel above the rim thereof when the package is closed, a hinge connecting an edge of the cover to one edge of the main panel and of one-piece construction with the cover and main panel, said cover having a rim that contacts with the rim of the side wall of the main panel when the package is closed, the rims being connected together by the hinge, a punch-out panel covering the mouths of all of the sockets so as to hold the products in the sockets, said punch-out panel being connected to the lower surface of the main panel and extending across the mouths of the sockets and being weak enough to rupture under each pocket when pressure is applied to the upper end of a pocket to push the product in each socket through the punch-out panel to remove the product from the socket.

4,169,532

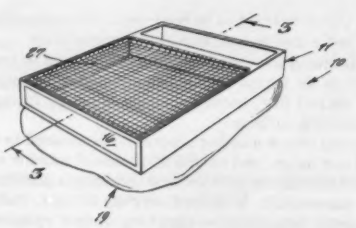
PARTS TRAY

Umberto Scapellati, 199 Grand Blvd., Deer Park, N.Y. 11729

Filed Jun. 1, 1978, Ser. No. 911,358

Int. Cl.[2] B65D *1/36*

U.S. Cl. 206—557 **3 Claims**

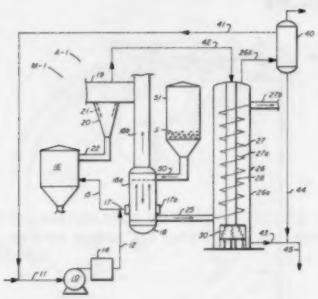


1. A portable tray, comprising in combination, a tray member of molded plastic having a well and narrow trough formed thereupon by a partition therebetween, a removeable screen dish placed on a top of a said well, and a removeable sand bag positioned directly beneath an underside of said tray member; said well including a magnetic plate at a bottom thereof; said screen dish being made of a wire mesh; and said removeable sand bag having magnetic granules added to a sand thereof.

4,169,533
METHOD OF TREATING SPONGE IRON

Charles A. Rubio, Houston, Tex., assignor to CVG-Siderurgica Del Orinoco, C.A., Venezuela

Filed Oct. 25, 1977, Ser. No. 844,733
Int. Cl.[2] B07B *4/02*
U.S. Cl. 209—11 7 Claims



1. A method of deactivating recently-reduced sponge iron pellets for storage and shipment by reducing the temperature of the pellets and removing the sponge iron fines that are highly pyrophoric from the pellets, including the steps of:

transferring freshly reduced sponge iron from a reducing reactor to a separation vessel;

passing a non-oxidizing gas stream through the freshly reduced sponge iron and separating the sponge iron fines from the sponge iron pellets by fluidizing the sponge iron fines, which are carried away in the stream of non-oxidizing gas;

partly cooling the sponge iron pellets with the stream of non-oxidizing gas substantially simultaneously with the separation of the fines from the pellets;

transferring the sponge iron pellets from said separation vessel to a vibratory conveyor in a non-oxidizing environment;

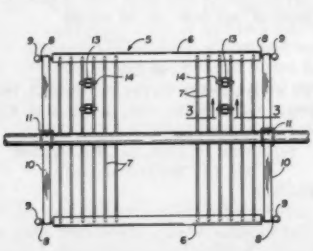
conveying the sponge iron pellets along a vibratory, helical path toward a storage area; and

directing a non-oxidizing cooling gas through the sponge iron pellets as they are vibratorily conveyed along said helical path to simultaneously convey and cool the remaining sponge iron pellets in order to reduce the temperature level substantially throughout the conveyed sponge iron pellets thereby cooling the sponge iron pellets substantially throughout to a temperature level where they are stable and their tendency to reoxidize is minimal.

4,169,534
GARMENT HANGER

Marion Donovan, 850 Park Ave., New York, N.Y. 11021

Filed Jul. 19, 1978, Ser. No. 925,967
Int. Cl.[2] A47F *7/19*
U.S. Cl. 211—113 8 Claims

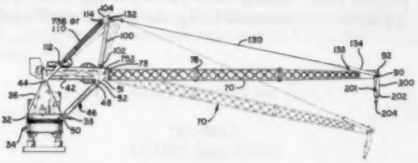


1. A garment hanger including a normally horizontal rectangular frame having a pair of spaced parallel side rails, a multiplicity of spaced parallel rods spanning the distance between said side rails and having their ends affixed thereto, a plurality of means removably supported by spaced selected pairs of said spaced parallel rods for suspending garments beneath said frame, said suspending means each comprising at least a pair of spring-biased clips, each of said clips being fitted between a selected pair of said spaced parallel rods and slidably supported thereon for movement in a direction parallel to the axes thereof, each said at least a pair of spring-biased clips being oriented in parallelism with said side rails, and means for suspending said frame from a support located thereabove.

4,169,535
CRANE

John F. Bryan, Jr., Dallas, Tex., assignor to Pyramid Manufacturing Company, Houston, Tex.

Division of Ser. No. 721,775, Sep. 9, 1976, abandoned. This application Jul. 31, 1978, Ser. No. 929,701
Int. Cl.[2] B66C *23/00*
U.S. Cl. 212—8 R 9 Claims



1. A Crane Comprising:

(a) a base structure;

(b) a boom comprising a first boom section and a second boom section;

(c) said first boom section pivotally supported for vertical swinging movement near one first end thereof to said base section;

(d) a second boom section pivoted to a second end of said first boom section for vertical swinging movement relative to said first boom section at one end and the other end adapted for securing a load thereto;

(e) hydraulic cylinder means for pivoting said first boom section on the base structure;

(f) an upwardly extending mast attached to the boom and first tension means attached to said second boom section and said mast;

(g) a second tension means attached to said mast and said first boom section adjacent said first end having adjustable resilient shock absorbing means for permitting pivoting movement of said second boom section relative to said first boom section when the loading on said second boom section exceeds a predetermined value.

4,169,536
HARVESTING MACHINE WITH AN EXPANDABLE TRUCK LOADER

David M. Seem, Seem Dr., Kutztown, Pa. 19530

Filed Oct. 27, 1977, Ser. No. 845,966
Int. Cl.[2] B60P *1/36*
U.S. Cl. 414—334 3 Claims

1. In combination with a harvester machine for cutting plants with crop thereon, separating the crop from the vines of said plant and loading the separated crop into a truck, truck loading apparatus comprising:

(a) a fixed frame attached to said harvester machine,

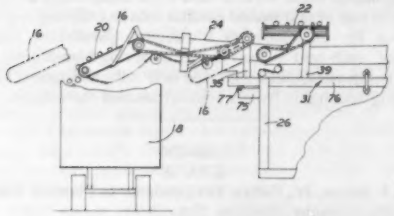
(b) a movable frame movably mounted to said fixed frame,

(c) a truck loading conveyor for delivering said crop to said truck,

(d) means for pivotally mounting said truck loading conveyor to one end of said movable frame to permit free

pivotal movement thereof about a vertical axis if physically contacted by said truck,

(e) a second conveyor fixedly mounted to said movable frame for delivering said crop to said pivoted truck loading conveyor, and



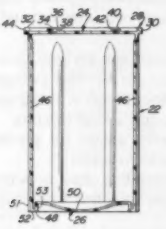
(f) means for extending and retracting said movable frame with respect to said fixed frame of said harvester machine to permit said truck to be loaded with said crop from said pivoted truck loading conveyor when said truck is moving at different distances alongside said harvester machine.

4,169,537

STORAGE DRUM

Bernard S. Sabreen, and Martin Aaron, both of Philadelphia, Pa., assignors to Centennial Plastics Co., Inc., Camden, N.J.

Filed Mar. 22, 1978, Ser. No. 889,154
Int. Cl.[2] B65D *7/44*
U.S. Cl. 220—70 **9 Claims**



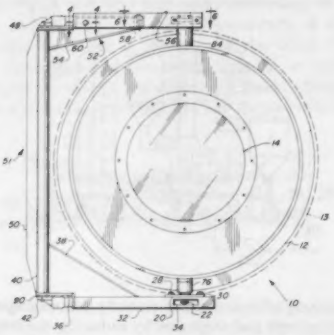
1. A drum for storing flowable materials, said drum being formed as an integral unit of thermoplastic and having a cylindrical sidewall, a bottom wall, a top wall and a radially outwardly projecting flange at the juncture of the top wall and sidewall, each of said walls being of the same thickness throughout, said bottom wall including a peripheral ledge and a domed portion, said ledge having an outer cylindrical surface which is flush with said cylindrical sidewall and in the same plane therewith, a flat bottom surface extending radially inward from said outer cylindrical surface and an inner cylindrical surface extending upwardly from said bottom surface and merging with said domed portion, said bottom surface forming a planar base for the drum and said domed portion curving downward from the point immediately adjacent said ledge to the center of said bottom wall, the center of the domed portion being coplanar with the bottom surface, said side wall including plural parallel longitudinally extending reinforcing ribs equidistantly spaced about the periphery of the sidewall, each of said ribs being in the form of an elongated arcuate depression in the sidewall exterior and extending continuously the full height of the drum from the bottom surface of said ledge to immediately below the flange of said top wall.

4,169,538

ADJUSTABLE DOOR ARRANGEMENT FOR A VACUUM CHAMBER

Harry L. Bird, Red Hook, and David T. Sutherland, Woodstock, both of N.Y., assignors to The Virtis Company, Inc., Gardiner, N.Y.

Filed Jul. 28, 1978, Ser. No. 929,118
Int. Cl.[2] B65D *43/14, 51/04*
U.S. Cl. 220—334 **6 Claims**



1. An adjustable door arrangement for closing an entrance to a vacuum chamber comprising:

a frame assembly including

a vertically disposed hinge member pivotably mounted at an upper end at a lower end thereof to supporting structure connected to the vacuum chamber;

a lower arm member mounted at one end to the lower end of said hinge member and the other end extending essentially horizontally therefrom;

an upper arm member mounted at one end to the upper end of said hinge member and the other end extending essentially horizontally therefrom essentially parallel to said lower arm member;

a door dimensioned to fit over the entrance of the vacuum chamber, said door pivotably mounted at upper and lower pivot points between the extended ends of said upper and lower arm members;

first means for adjusting the position of said frame assembly and said door vertically with respect to the vacuum chamber;

second means for adjusting the position of said door vertically with respect to said frame assembly;

third means for adjusting the position of the lower pivot point of said door horizontally along said lower arm member;

fourth means for adjusting the position of the upper pivot point of said door horizontally along said upper arm member;

fifth means for adjusting said upper arm member in a horizontal plane so that the relative vertical alignment of the upper pivot point of said door with respect to the lower pivot point of said door can be varied.

4,169,539

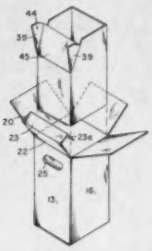
CARTON AND LINER WITH INTEGRAL HANDLE

Jerry D. Price, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 20, 1978, Ser. No. 953,156
Int. Cl.[2] B65D *5/46, 5/56*
U.S. Cl. 220—410 **5 Claims**

1. In a paperboard container having four enclosing body walls and end closures with a paperboard liner having four body walls and a bottom end closure nestled therein, the improvement of a hand hole comprising an opening formed in a first body wall of said container body walls positioned substan-

tially near the top of said body wall, an upwardly and inwardly inclined panel adjacent said opening and forming a part of the adjacent first body wall of said liner, and a first top closure flap



extending from said first body wall of said container which lies in a folded position against the outer surface of said inclined panel of said liner.

4,169,540

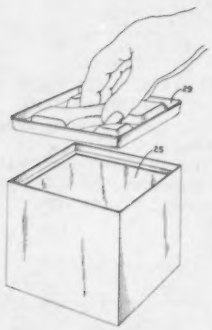
PACKAGING CONTAINER

Lars-Goran Larsson, Malmo, and Bertil S. O. Murne, Oxie, both of Sweden, assignors to Aktiebolaget Platmanufaktur, Malmo, Sweden

Continuation of Ser. No. 681,231, Apr. 28, 1976, abandoned. This application Oct. 6, 1977, Ser. No. 840,100

Int. Cl.[2] B65D *5/56, 25/16*

U.S. Cl. 220—462 **6 Claims**



1. A package comprising an outer container of stiff material, and an inner container of flexible sheet material, said inner container having a shape of a parallelepiped and being positioned within the inner space of said outer container for enclosing material therein, said inner container being made of a continuous flat sheet of material and having four side walls, a top wall, and a bottom wall which define said parallelepiped shape, each of two of said four side walls opposite to one another having thereon extending the entire longitudinal length thereof a weld seam, each of said two side walls also having attached thereto a flap extending from said top wall and being folded toward said bottom wall and sealed against the respective side walls, each flap comprising a weld seam continuous with the weld of its respective side surface, said top wall being constituted by the thickness of the sheet of material of the inner container and being free from flaps and folds to form a flat smooth surface, said bottom wall comprising a plurality of flaps continuous with said four side walls and sealed together to constitute a tight seal; said outer container comprising four side walls corresponding to said four side walls of said inner container, a top wall corresponding to said top wall of said inner container, and a bottom wall corresponding to said bottom wall of said inner container, said outer container further comprising a circumferential flange positioned adjacent to and spaced from said top wall of said outer container, said circumferential flange extending inwardly from the inner walls of said four side walls of said outer container so as to overlap said top wall of said inner container, said circumferential flange also having means for securing said top wall of said inner container thereto, weld seams at the juncture between said flaps and the side walls, said weld seams extending along the width of said side walls and stabilizing the folds between the flaps and side walls and the shape of the inner container in the region of the securing of said top wall with the circumferential flange of the outer container, and a cover lid sealably fittable within the outer container for enabling the removal of the material contained in said inner container and the subsequent closing thereof, said cover lid resting in its closed position sealably on said circumferential flange, whereby upon the cutting open of said top wall of said inner container via the opening defined by said circumferential flange the filling material in said inner container may be discharged.

4,169,541

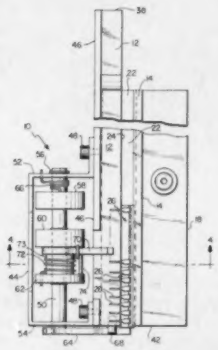
DIP COMPONENT STORAGE AND DISPENSING MAGAZINE

Phillip A. Ragard, and Robert H. Holmes, both of Binghamton, N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.

Filed Dec. 15, 1977, Ser. No. 860,728

Int. Cl.[2] B65G *59/06;* **H05K** *13/02*

U.S. Cl. 221—281 **2 Claims**



1. A magazine for vertical storage and dispensing of a plurality of DIP components, said storage being end to end, comprising:

an elongated guide rail parallel and opposed to and spaced apart from an elongated channel to form a chute therebetween, said guide rail being contoured to be straddled with a sliding fit by opposed pairs of prongs of said DIP components, said spacing apart being only sufficient to pass the body of said DIP components;

a first finger rigidly attached to and rotating with a shaft, said shaft being parallel to said guide rail and said channel, said first finger being located in proximity to and blocking the discharge end of said chute;

a second finger, pivotably attached to said shaft, said second finger being spaced above said discharge end of said chute and apart from said first finger and said second finger being spaced apart from said guide rail when said first finger blocks the discharge end of said chute, said second finger moving laterally against a prong of the next lowest of said stored DIP components when said shaft is rotated causing said first finger to unblock said chute;

said shaft including a first spring to bias said first finger toward said position blocking the discharge end of said chute, said shaft rotation to unblock said chute being

opposed by said spring bias, whereby when the force causing said shaft rotation is removed, said shaft and said fingers return to their original positions and the cycle may be repeated; and

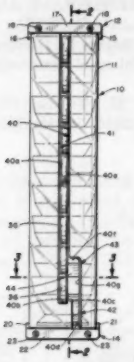
a second spring interconnected between said shaft and said second finger, said second spring being biased to maintain a fixed position of said second finger relative to said shaft, said second finger pivoting relative to said shaft in opposition to said spring bias when said second finger moves against said DIP prong as said shaft rotates to unblock said chute, whereby said second finger retains said next lowest component before said lowest component is dispensed and different thicknesses of said prong may be accommodated.

4,169,542

DISPENSER FOR CUP HOLDERS

Walter L. Miller, 1009 Main St., Delta, Colo. 81416

Filed Aug. 29, 1977, Ser. No. 828,336
Int. Cl.[2] A47F *1/08*
U.S. Cl. 221—303 **7 Claims**



7. A dispenser for a plurality of stacked cup holders, each having a projecting handle comprising:

first means for confining said cup holders in a vertically stacked relationship, said first means comprising wall means defining a passage for receiving each of said cup holders at the top thereof and dispensing said cup holders at the bottom thereof;

said first means comprising second downwardly extending means in said wall means for guiding said handles of said stacked holders from the top of said first means downwardly;

an opening through said wall means below said second means providing for rotation of the bottom holder and handle relative to the other stacked holders;

said opening having a transverse edge for supporting the handle of said bottom holder when in said stacked relationship; and

a slot in said wall means displaced from said second means and extending from said opening to the bottom of said first means for passage of the handle of said bottom holder out of said first means to dispense said bottom holder from said first means.

4,169,543

AMPLITUDE RESPONSIVE DETECTOR

David L. Hall, Houston, Tex., assignor to Keystone International, Inc., Houston, Tex.

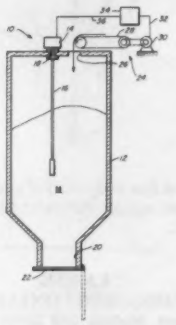
Filed Oct. 20, 1977, Ser. No. 844,040
Int. Cl.[2] B67D *5/08*
U.S. Cl. 222—56 **54 Claims**

1. Apparatus for detecting the presence or absence of material at a location comprising:

(a) signal generation means for providing an oscillatory signal;

(b) sensor means, including antenna probe means for positioning at said location, and for receiving said oscillatory signal;

(c) converter means for producing a voltage level whose value is dependent on the amplitude of said oscillatory signal so received by said sensor means;



(d) set point circuit means for producing a voltage reference level to which said voltage level produced by said converter means is added; and

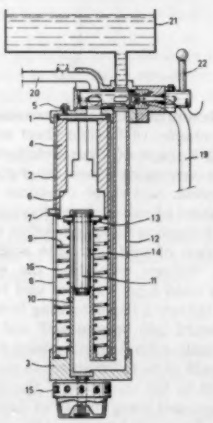
(e) switching means, operable by the voltage sum of said voltage reference level and said voltage level, for providing an output signal dependent on the presence or absence of material at said location.

4,169,544

MIXING AND DISTRIBUTING APPARATUS FOR GASOLINE AND OIL

André F. Blanchet, Le Perreux, France, assignor to Satam Industries, La Courneuve, France

Filed Sep. 19, 1977, Ser. No. 834,266
Claims priority, application France, Sep. 24, 1976, 76 28748
Int. Cl.[2] G01F *11/06*
U.S. Cl. 222—134 **4 Claims**



1. A mixing and distributing apparatus comprising inlet means for oil, a duct for gasoline under pressure and a delivery duct, a first vertical cylinder fed from the top with oil and gasoline through a valve of a distributing unit in which slides a first piston, biased upwards by a spring, said cylinder being connected to the delivery duct via the valve, a second vertical

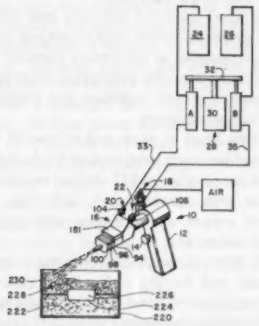
cylinder located inside the first cylinder, under the first piston, in which slides a second oil piston, the lower portion of said second cylinder being connected with the upper portion of the first cylinder and with the inlet means via said valve, a first position of said valve allowing the first cylinder to be fed with gasoline under pressure, wherein said gasoline under pressure urges the first piston downward against the biasing spring, said first piston through abutment means in the final portion of its stroke urging the second piston downward to supply a metered amount of oil to the first cylinder so as to mix with the pressurized gasoline, a second position of the valve terminating the supply of oil and gasoline, said mixture being then expelled by the first cylinder piston under the effect of the biasing spring through the valve to the delivery duct.

4,169,545

PLURAL COMPONENT DISPENSING APPARATUS

Herman W. Decker, Stuart, Fla., assignor to Ransburg Corporation, Indianapolis, Ind.

Filed Aug. 1, 1977, Ser. No. 820,839
Int. Cl.[2] B05B *7/04*
U.S. Cl. 222—136 **17 Claims**



1. A plural component dispensing apparatus comprising first means for supplying a first component, second means for supplying a second component, a housing for providing a cylinder, a piston disposed for reciprocation in the cylinder in response to fluid pressure on one side or the other thereof, a trigger for controlling fluid pressure in the cylinder, the trigger being movably mounted in the housing, a rod connected to the piston and reciprocable therewith, rack means provided on the rod, first and second rotary valve means for controlling the flow of the first and second components from the first and second supply means, respectively, at least a first pinion gear connected to the first and second valve means and engaging the rack means, reciprocation of the piston causing rotation of the first and second valve means between first orientations providing flows of the first and second components and second orientations blocking flow of the first and second components, the first and second valve means and pinion gear being attached to the housing and the housing being sized to be handheld and operated.

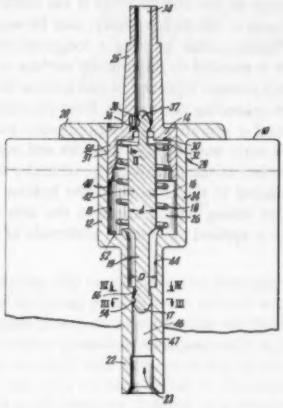
4,169,546

FRICTION DRAG PUMP ASSEMBLY

Edward R. Yuhas, Yonkers, and Gilbert L. Abrams, Valley Cottage, both of N.Y., assignors to Vertico Industries, Inc., New York, N.Y.

Continuation of Ser. No. 767,829, Feb. 11, 1977, abandoned. This application Jul. 3, 1978, Ser. No. 921,806
Int. Cl.[2] B67D *5/42*
U.S. Cl. 222—341 **6 Claims**

1. A pump assembly for dispensing fluid from within a container comprising tank means and piston means defining therebetween a chamber, said tank means and said piston means being constructed and arranged for movement by said piston means relative to said tank means toward a first relative position to draw fluid into said chamber and toward a second relative position to pump fluid out of said chamber, said piston means including an abutment member; spring means for applying a spring biasing force urging said tank means and said piston means toward said first relative position; inlet means formed integrally with said tank means defining an inlet flow path from said container into said chamber; outlet means formed integrally with said piston means defining an outlet flow path from said chamber through which said fluid may be dispensed from said chamber; poppet means extending between said inlet means and said outlet means and including outwardly extending shoulder means and a closure member;



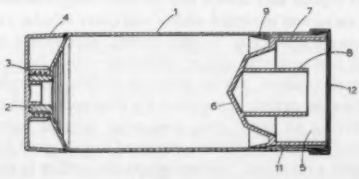
said piston means abutment member constructed and arranged to abut said shoulder means and move said poppet means as said piston means moves relative to said tank means toward said second relative position; a valve seat formed within said outlet means, said valve seat constructed and arranged to abut and engage said closure member to close said outlet flow path and to move said poppet means when said piston means moves relative to said tank means toward said first relative position; and means for applying a frictional force between said inlet means and said poppet means to cause said poppet means to resist said movement by said piston means and to urge said closure member against said valve seat to close said outlet flow path when said piston means is moving relative to said tank means toward said first relative position.

4,169,547

OINTMENT CONTAINER WITH FINGER ACTUATED PISTON

Robert E. Newell, Pinner, England, assignor to Glaxo Laboratories Limited, Greenford, England

Filed Oct. 26, 1977, Ser. No. 845,828
Claims priority, application United Kingdom, Oct. 26, 1976, 44384/76
Int. Cl.[2] B65D *35/30*
U.S. Cl. 222—386 **4 Claims**



1. A dispenser for creams and the like, the dispenser com-

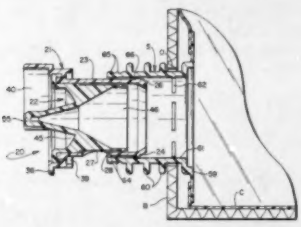
prising a hollow body member; a dispensing nozzle at the forward end of the body and communicating with the interior thereof; an opening at the rear end of the body; a dispensing plunger slidably retained in the interior of the body, one face of the plunger being directed forwardly towards the dispensing nozzle and a second opposing face being rearwardly directed and accessible through the open rear end of the hollow body to enable the plunger to be urged towards the nozzle end of the body; an outwardly flaring, resilient collar extending forwardly of and secured to the plunger, the forward edge portion of the flaring collar having an outer periphery pressing against the interior surface of the hollow body, so as to form a sliding, sealing fit therewith, the diameter of the outer periphery of the flaring collar would be greater than that of the internal diameter of the hollow body if the collar were freed from the restraint of the hollow body; said forward edge portion of said flaring collar forming a longitudinally extended surface which is parallel to the interior surface of the hollow body when said plunger is placed in said hollow body member; a skirt portion extending rearwardly from the forward face of the plunger and a plurality of longitudinally extending ribs formed on the outer periphery of the skirt and in contact with the internal surface of the hollow body; whereby the plunger is sealably connected to the interior of the hollow body and is prevented from tilting with respect to the axis of the body when pressure is applied against the underside of the plunger.

4,169,548

FLEXIBLE DISPENSER VALVE

Curtis J. Bond, Marion, Ohio, assignor to Liqui-Box Corporation, Columbus, Ohio

Filed Mar. 13, 1978, Ser. No. 886,179
Int. Cl.[2] B65D *47/20*
U.S. Cl. 222—505 **18 Claims**



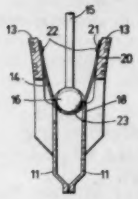
1. In combination, a valve assembly comprising an outer tubular valve unit having an orifice and adapted to be slidably mounted in a tubular spout or the like for sliding movement to cover or expose said orifice and an inner toggle-actuated self-closing valve unit mounted within said outer tubular valve unit and having a resiliently flexible sealing skirt which normally lies over and seals the orifice; said inner valve unit including toggle means which can be actuated to flex the sealing skirt away from the orifice to expose it for dispensing; and a tubular spout having an outer end, said outer tubular valve being telescoped within and slidably mounted in said spout for movement from a retracted position where the orifice is within the spout to an extended position where the orifice is beyond the outer open end of the spout.

4,169,549

CLIPPING HANGER

Tosio Takagi, No. 28-4, 2-chome, Shin-takada-cho, Kita-ku, Kitakyushu-shi, Fukuoka-ken, Japan

Filed Aug. 12, 1976, Ser. No. 713,874
Claims priority, application Japan, Aug. 27, 1975, 50-118378[U]; Oct. 9, 1975, 50-122805
Int. Cl.[2] A47J *51/142*
U.S. Cl. 223—96 **3 Claims**



1. A clipping hanger comprising:

a pair of opposing gripping plates;

a resilient U-shaped member between and integrally connecting said gripping plates, said U-shaped resilient member having an opening at the center thereof;

squeeze arm means vertically projecting from each gripping plate for being squeezed together and forcing said gripping plates to spread apart;

leaf spring means fixed at each end to one of said squeeze arm means and having a bent portion in the middle thereof fitted in said opening in said U-shaped member for urging said squeeze arm means apart, whereby urging said squeeze arm means apart forces said gripping plates toward each other; and

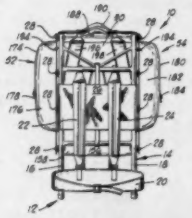
a rod rotatably fitted through said opening in said U-shaped member, said rod having a hook portion at one end thereof projecting above said opening and a ball portion at the other end thereof rotatably socketed in said opening in said U-shaped member and supported from beneath by said bent portion of said leaf spring means in said opening.

4,169,550

EMERGENCY MEDICAL KIT

Paul K. Williams, Arlington, Tex., assignor to Emergency Medical Equipment Incorporated, Oklahoma City, Okla.

Filed May 12, 1977, Ser. No. 796,410
Int. Cl.[2] A45F *3/00*
U.S. Cl. 224—211 **2 Claims**



1. A medical kit supportable on the back of a person and holding medical kit equipment members, the medical kit comprising:

a flexible sheet member having a first end and a second end, an outer peripheral edge, and a first face and a second face, the sheet member having an unfolded position wherein the first end is disposed generally away from the second end and the first face is exposed, and having a

folded position wherein the first end and the second end are positioned in close spatial relationship to each other;

holding means comprising a plurality of flexible compartment pockets connected to the sheet for removably holding and protecting a plurality of medical kit members in a predetermined position so that portions of the medical kit members are accessible when the sheet is positioned in the unfolded position and other portions of the medical kit members are accessible when the sheet is positioned in the folded position, the holding means comprising: a plurality of flexible covers forming with

the sheet member a plurality of compartments, each compartment having an opening for providing access to the respective compartment, a portion of the medical kit members being retained within each of the compartments, comprising:

a flexible first cover connected to the first face of the sheet member, the first cover forming with the sheet member a first pocket compartment having a opening for providing access to the first pocket compartment, a portion of the medical kit members being retained within the first pocket compartment;

a flexible second cover connected to the first face of the sheet member, the second cover forming with the sheet member a second pocket compartment having an opening for providing access to the second pocket compartment, a portion of the medical kit members being retained within the second pocket compartment, the first pocket compartment disposed near and spaced a distance from the second pocket compartment, the first cover and the second cover cooperating to form an envelope pocket compartment between the first and second pocket compartments, the envelope pocket compartment having an opening thereto disposed between the first and second pocket compartments; and

closure means having a portion connected to each cover near the respective opening for sealing each compartment;

closure means connected to the outer peripheral edge of the sheet for selectively maintaining the sheet in the folded position so that the compartment pockets supported on the first face of the sheet are sealed from the outside environment when the sheet is in the folded position, the closure means comprising:

a zipper assembly connected to the outer peripheral edge of the sheet member, the zipper assembly having an open position and a closed position, the sheet member being positionable in the unfolded position in the open position of the zipper assembly, and the sheet member being maintained in the folded position in the closed position of the zipper assembly so that the pocket compartments supported on the first face of the sheet member are sealed from the effects of the outside environment;

support means for attaching the sheet member to the back of a person so that the second face of the sheet member is positioned substantially along the person's back, the support means comprising:

a pack support frame generally shaped to conform to the back of the person, having a plurality of spaced apart post members, each post member having a bore therethrough;

strap means for attaching the pack support frame to the person so that the frame is positioned against the back of the person; and

connector means for connecting the flexible sheet member to the pack support frame, the connector means comprising:

a plurality of ring members equal in number to the number of post members and connected to the second face of the sheet member, each one of the ring members disposable over one of the post members; and

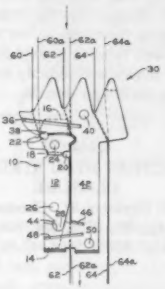
at least one retainer rod insertable through the bores of the post members and retainable therein to lock the ring members onto the post members so that the sheet member is secured to the pack support frame.

4,169,551

APPARATUS FOR THREADING MOVING STRANDS

Thomas H. Jensen, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 28, 1978, Ser. No. 882,027
Int. Cl.[2] G03B *1/56*
U.S. Cl. 226—92 **5 Claims**



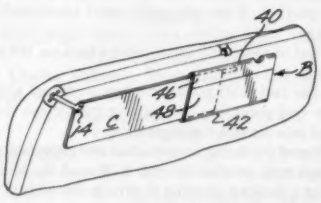
1. A rethreading clip constructed and arranged to rethread a broken strand or thread passing into a process wherein a multiplicity of strands pass in parallel through said process comprising a guide member slotted on its lateral walls to permit strand to pass freely through said slots, retaining means constructed to grip one end of a broken thread to be attached thereto, means in said guide member to insert said retaining means so that when inserted in said guide member said retaining means contacts a moving strand in one of said slots to firmly clamp at least one thread passing through one of said slots to the body of said guide member.

4,169,552

ADJUSTABLE AUTOMOTIVE AND AIRCRAFT SUN VISOR EXTENSION

Arthur L. Lichtenstein, 4548 N. Meridan Ave., Fresno, Calif. 93726; Vincent Petruzzi, 1124 Cedar St., San Carlos, Calif. 94070, and Michael P. Anderson, 1162 Cardoza, Tulane, Calif. 93274

Filed Mar. 16, 1978, Ser. No. 887,419
Int. Cl.[2] B60J *3/02*
U.S. Cl. 296—97 C **2 Claims**



1. An elongate laterally adjustable, light diminishing extension capable of being slidably mounted for longitudinal adjustment on sun visors of different widths that are mounted on an automotive or aircraft vehicle, said sun visor being generally rectangular in space, and said extension including:

a. a single rectangular sheet of a bendable light diminishing material that has first and second spaced parallel fold lines therein that subdivide said sheet into a forward panel, a rearwardly disposed downwardly extending first flap of

sufficient width as to overlie said upwardly extending flap said material being of a type that removes at least a portion of the sun rays directed thereon;

b. a second downwardly extending flap secured to said forward surface of said first flap, said first and second flaps defining a space therebetween in which an upwardly disposed portion of said upwardly extending flap is adjustably and removably disposed; and

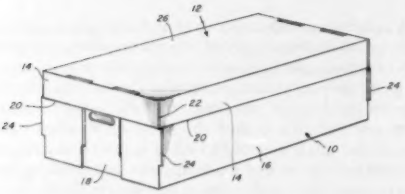
c. fastening means that include an engageable member on said first flap and an engaging member on said second flap, and a plurality of aligned spaced openings in said upwardly extending flap, with any desired one of said openings capable of being positively engaged by said engageable and engaging members to vary the distance of said second folding line relative to said first folding line to the extent that said sleeve will slidably and frictionally engage a sun visor of a particular width.

4,169,553

BOX CONSTRUCTION WITH STRENGTHENED LID CLOSURE

Selwyn H. Cain, 280 Boylston St., Chestnut Hill, Mass. 02167

Filed May 30, 1978, Ser. No. 910,213
Int. Cl.[2] B65D *5/64, 43/00, 5/26*
U.S. Cl. 229—43 **1 Claim**



1. A box and a cover therefor comprising:

said box being formed from a blank having a generally rectangular wall panel and a pair of sidewall panels attached to and extending from the sides of the bottom wall panel;

the blank having a pair of end wall panels attached to and extending from the ends of the bottom wall panel, the blank having fold lines defining said panels from each other;

the blank having an end flap attached to each end of each side wall panel, each end flap being defined in part by an end flap fold line which extends in a direction in line with the fold line between the bottom panel and an associated end wall panel, said end flap fold line being interrupted by a U-shaped cut which extends from said end flap fold line into a portion of the side wall panel associated with said end flap;

the free end of each end flap having a locking tab projecting therefor;

each of the end wall panels having a pair of slots formed therein and receiving the locking tabs when the blank is erected into its box configuration;

said U-shaped cut being constructed and arranged so that the end flaps may overlie the end walls and the U-shaped cut defining a locking opening in which the ends of its associated locking tab are received;

that portion of the box which is defined by the U-shaped cut remaining attached to its associated end flap and projecting outwardly from the corner of the box, said projection terminating, at its upper end, in a shoulder disposed below the upper edge of the walls of the box;

said cover having a top wall and a downwardly surrounding skirt adapted to rest on and surround the upper end of the container;

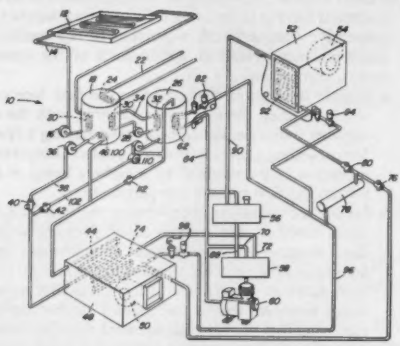
the height of the skirt and the heightwise location of the shoulder formed by the projection being substantially equal whereby the lower edge of the skirt, at the corner regions, may rest, at least partly on said shoulders.

4,169,554

SOLAR ENERGY SYSTEM WITH HEAT PUMP ASSISTANCE

Eldon D. Camp, R.R. 2, Bloomington, Ill. 61701

Filed Oct. 20, 1977, Ser. No. 844,032
Int. Cl.[2] F24D *11/02;* **F24J** *3/02*
U.S. Cl. 126—427 **14 Claims**



1. Apparatus for controlling the thermal conditions existing in an environmental space, comprising:

fluid means for exchanging heat energy;

means for collecting heat energy, the fluid means being contained at least partially within said collecting means;

means for storing the heat energy collected by said collecting means, the fluid means at least exchanging heat energy with said storing means;

means for exchanging heat energy between the storing means and air which is to be distributed into the environmental space, the exchanging means being thermally connected to the storing means;

means for distributing the air after heat exchange contact with said exchanging means to and from the environmental space; and,

heat pump means for altering the function of the apparatus to provide heating or cooling of the environmental space, said storing means comprising tank means and a phase change material disposed within the tank means, said material having a latent heat of fusion and being meltable within a temperature range near the upper temperature range of normal comfort thermal conditions within an environmental space.

4,169,555

EXTENDIBLE EXIT CONE

Gearld E. Crowe, Santa Clara, Calif., assignor to United Technologies Corporation, East Hartford, Conn.

Filed Jul. 25, 1977, Ser. No. 818,906
Int. Cl.[2] B64D *33/04*
U.S. Cl. 239—265.33 **8 Claims**

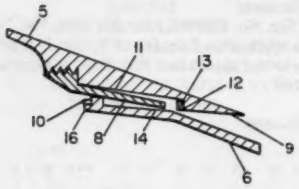
1. A telescoping extendible nozzle exit cone assembly comprising, in combination, an inner exit cone and at least one outer exit cone, said outer cone being mounted around said inner cone and movable with respect thereto from a first stowed position to a second deployed position and locking means for locking said outer exit cone to said inner exit cone in the deployed position, said locking means comprising:

(a) a substantially constant external diameter locking ramp formed about the periphery of said inner core, said ramp terminating at its rearward end in an outwardly directed locking shoulder;

(b) a plurality of retaining fingers mounted about said inner cone, overlying said locking ramp portion and being bi-

ased away therefrom, said retaining fingers terminating a predetermined distance from said locking shoulder; and

(c) a substantially constant internal diameter rim portion formed on the forward portion of said outer cone, said rim



portion, at its forward end, terminating in an inwardly directed locking step sized to be received in locking relationship between the end of said retaining fingers and said locking shoulder.

4,169,556

FLAT JET DISCHARGE DEVICE FOR A MIXTURE OF A PRESSURIZED LIQUID WITH SOLID PARTICLES

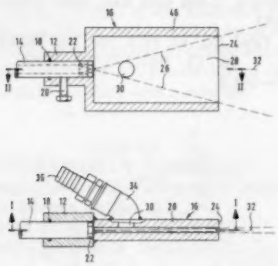
Horst Müller, Duisburg, Fed. Rep. of Germany, assignor to Myers-Europe GmbH, Essen, Fed. Rep. of Germany

Filed Oct. 31, 1977, Ser. No. 846,763

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1976, 2648445

Int. Cl.[2] B05B *7/14*

U.S. Cl. 239—434 **5 Claims**



1. A flat jet discharge device for a mixture of a pressurized liquid with solid particles, comprising a connecting socket for a liquid conduit, an inlet for solid particles, and a tubular mouthpiece of flat cross-sectional shape, said mouthpiece having two broad sides and two narrow sides extending forwardly toward a front face, and a central plane parallel to the broad sides, wherein said connecting socket for said liquid conduit includes an internal nozzle arranged coaxially with said mouthpiece and defines lateral delimitations facing the narrow sides of the mouthpiece, at least the portions of said jet located rearwardly of the vicinity of said front face being spaced from said broad and narrow sides, and wherein said inlet for solid particles is disposed at one of said broad sides of said mouthpiece in an area in which the projection of the inlet on said central plane of the mouthpiece lies completely within said lateral delimitations of said liquid jet when viewed in a direction perpendicular to said central plane.

4,169,557

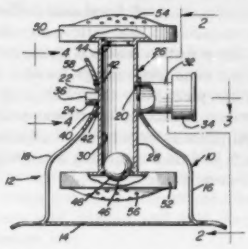
INVERTIBLE GARDEN SPRINKLER

George S. Greeott, 9605 Chalk Hill Rd., Healdsburg, Calif. 95448

Filed Dec. 28, 1977, Ser. No. 865,325

Int. Cl.[2] B05B *1/16*

U.S. Cl. 239—443 **5 Claims**



1. A sprinkler construction including a base, a body supported from said base for oscillation relative thereto about a generally horizontal axis, said body being hollow and including tubular inlet neck opening outwardly from the interior thereof along a path at least closely adjacent and paralleling said axis, the outer end of said neck being adapted to have the discharge end of a water supply line coupled thereto, said body defining an elongated interior compartment into which said neck opens and including opposite end portions disposed on opposite sides of said inlet neck, each of said opposite end portions including means defining a valve seat facing toward said inlet neck, a gravity valve member mounted in said body for gravity movement therein between positions in seated engagement with said seats, said body being oscillatable relative to said base between positions with the remote ends of said opposite end portions alternately lowermost, said body further including a pair of different spray pattern sprinkler heads supported therefrom into which said opposite end portions open and disposed downstream from the corresponding seats, said base including means defining a horizontal aperture and an upwardly opening notch spaced horizontally from and aligned with said aperture, said body including an outwardly projecting stud rotatably received in said aperture and on the side of said body remote from said inlet neck, said inlet neck being cradled in said notch for rotation therein, the upper end of said notch being defined between a pair of generally parallel arm portions of said body whose upper ends are curved toward each other over upper opposite side portions of said neck for retaining the latter in said notch.

4,169,558

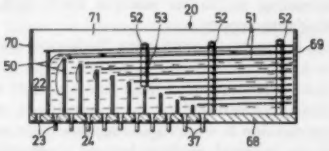
WATER DISTRIBUTION CHAMBER FOR AN ELECTRIC STEAM GENERATOR

Robert N. Contes, Bellevue, Wash., assignor to CAM Industries Inc., Kent, Wash.

Filed Sep. 1, 1976, Ser. No. 719,416

Int. Cl.[2] B05B *1/14*

U.S. Cl. 239—553.5 **5 Claims**



1. A water distribution chamber for an electric steam generator, said chamber having

an inlet at one end for receiving a flow of water;

a plurality of baffles forming a plurality of compartments downstream of said inlet, each said baffle having a horizontal overflow edge, said edges of said baffles being disposed in stepwise increasing height relative to the inflow direction of the flow of water;

at least one outlet nozzle in a bottom of each compartment for an outflow of a stream of water;

a plurality of flat damping elements of equal number to said baffles between said inlet and said baffles, said damping elements extending in said inflow direction towards said baffles to damp surface waves with each damping element being a sheet metal plate integral with a respective baffle to form a one-piece body therewith; and

a transverse dam in each compartment extending vertically to a height midway between two adjacent damping elements, each said dam extending at an angle through said respective compartment.

4,169,559

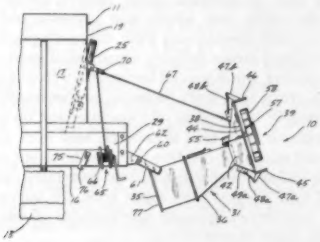
DISTRIBUTOR FOR PARTICULATE MATERIAL

Walter L. McKee, Cedar Rapids, Iowa, assignor to Henderson Mfg. Co., Cedar Rapids, Iowa

Filed Feb. 2, 1978, Ser. No. 874,486

Int. Cl.[2] A01C *19/00*

U.S. Cl. 239—672 **5 Claims**



1. A distributor for a particulate material pivotally mounted on a portable container including a rearwardly projected discharge chute having an underside with a discharge opening therein, comprising:

(a) a hopper with a lower outlet and an upper inlet for receiving particulate material discharged from said discharge opening,

(b) spreader means mounted on the lower end of said hopper for spreading particulate material discharged from the outlet of said hopper,

(c) means for pivotally supporting the hopper and spreader means for pivotal movement as a unit from an operating position in which said hopper and spreader means are positioned beneath said discharge opening to an elevated storage position in which said hopper and spreader means are in an inverted position located rearwardly of and above the underside of said discharge chute, and

(d) means associated with said container for moving said hopper and spreader means between said operating position and said storage position.

4,169,560

ELECTROSTATIC SPRAY GUN FOR POWDERED MATERIAL

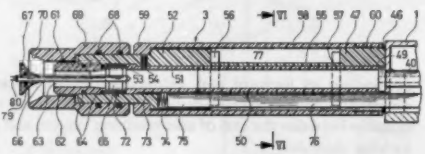
Gerhard F. Vöhringer, Friedrichshafen, Fed. Rep. of Germany, assignor to Elektrostatische Spritz— und Beflockungsgesellschaft G.F. Vohringer GmbH, Oberteuringen-Neuhaus, Fed. Rep. of Germany

Division of Ser. No. 670,976, Mar. 26, 1976, Pat. No. 4,088,268. This application Feb. 16, 1978, Ser. No. 878,377

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1975, 2514160

Int. Cl.[2] B05B *5/02*

U.S. Cl. 239—698 **10 Claims**



1. An electrostatic spray gun for powdered material comprising, in combination, a common housing; connection means for supplying powder and compressed gas; a spray tube, a spray nozzle; a charging device for electrostatically charging the powder, said connection means for the powder and compressed gas supply being held in said common housing portion; a gun barrel, said gun barrel with said spray nozzle comprising detachably nested hollow members fastened replaceable to the front side of said housing; a barrel head mounted on an outer end of said gun barrel and holding said spray nozzle fitting to an outer end of said spray tube fastened axially and radially to said housing by an exterior barrel tube; and a spacer enclosing said spray tube and held on both ends and rotating with said housing and said barrel head.

4,169,561

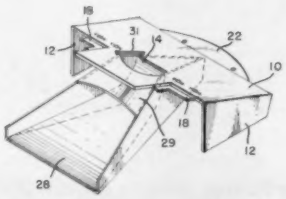
LAWN MOWER CHOPPING ATTACHMENT

Wilbur L. Saxton, 22808 66th Ave. West, Mountlake Terrace, Wash. 98043

Filed Jan. 13, 1975, Ser. No. 540,656

Int. Cl.[2] B02C *18/10, 18/22*

U.S. Cl. 241—101.1 **10 Claims**



1. An attachment for a rotary lawn mower having a powered rotary blade, a housing having an open bottom surrounding said rotary blade and a discharge outlet, and a plurality of ground engaging wheels carried on said housing, the improvement comprising a detachable planar platform having an upper surface for closing said housing bottom, means supporting said platform on an angle to the horizontal and vertically off the ground a distance sufficient to raise the lawn mower wheels off the ground and cause the housing to rest snuggly on the platform closing the bottom of the housing, a feed inlet in said platform adjacent and within the periphery of said housing, means for guiding articles to be chopped in through said feed inlet, and a bar fixed to the upper surface of said platform adjacent the feed inlet and positioned a slight distance below the plane of rotation of the rotary blade for shearing the arti-

cles between the blade and the bar whereby the attachment enables the lawn mower to be utilized to chop large articles, such as leaves, twigs, and small branches, and discharge the chopped articles through the mower housing discharge outlet.

4,169,562

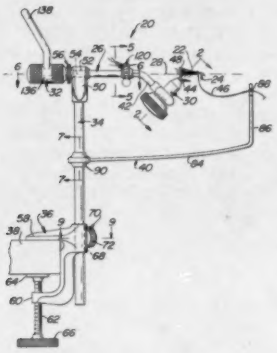
FLY TYING DEVICE

Andrew Renzetti, R.D. No. 4, Coatsville, Pa. 19320

Filed Apr. 28, 1978, Ser. No. 901,176

Int. Cl.[2] **A01K** *97/00;* **B65H** *81/00*

U.S. Cl. 242—7.01 **8 Claims**



1. A device for tying fish flies onto the shank of a fishing hook by wrapping a filament about said shank comprising, shaft means rotatable about a first axis, releasable securing clamping means mounted on said shaft at a compound angle thereto and having hook engaging means located immediately adjacent to said axis, said hook engaging means holding a portion of said hook adjacent to said shank so that said shank is fully exposed and disposed coaxially with said first axis, one-way clutch means for rotating said shaft about said first axis and for holding said shaft at any rotational position and support means for said shaft, said one-way clutch means being rotatable about said first axis in one direction, whereupon said shaft rotates therewith, and being rotatable in the opposite direction, whereupon the shaft does not rotate.

4,169,563

THREAD DRAW-OFF DEVICE

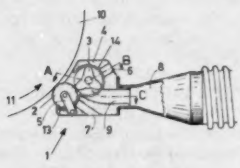
Erwin Leu, Horgen, Switzerland, assignor to Maschinenfabrik Schweiter AG, Horgen, Switzerland

Filed Oct. 30, 1978, Ser. No. 956,108

Claims priority, application Switzerland, Nov. 9, 1977, 13686/77

Int. Cl.[2] **B65H** *54/22*

U.S. Cl. 242—35.6 E **6 Claims**



1. A device for drawing the free thread end from a wound thread member, such as a bobbin, cop, or cheese, the device being of the type in which a suction nozzle connected to a suction source is moved into engagement with the rotating wound thread member to pull the thread end from the wound thread member into the nozzle, the improved nozzle therein comprising:

a nozzle housing having an inner suction passageway leading to a suction slot which opens to the exterior,

an elongated contact roller mounted on said housing at least partially in said suction slot so that it can be rotated by a movement of the wound thread member rotating against it and can have its position shifted toward the inside of the housing by the pressure of its contact with the wound thread member, and

an elongated clamping roller mounted in said suction slot with its axis substantially parallel to that of said contact roller and spaced back from said contact roller toward the inside of said housing so that it does not come in contact with the wound thread member, said clamping roller being rotated by said contact roller and having a circumferentially interrupted surface which in cooperation with said contact roller produces intermittent thread clamping points between said contact and said clamping rollers along said suction slot.

4,169,564

YARN GUIDE FOR USE IN WINDING YARN ON A PACKAGE

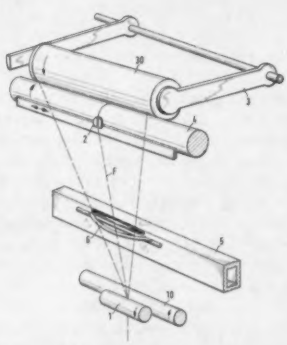
Karl-Heinz Lehmann, and Peter Artzt, both of Pfullingen, Fed. Rep. of Germany, assignors to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany

Filed Jul. 27, 1977, Ser. No. 819,481

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1976, 2634251

Int. Cl.[2] **B65H** *57/00, 57/26, 59/36*

U.S. Cl. 242—157 R **5 Claims**



1. A device for guiding yarn as it is wound on a package from a source at a constant speed comprising:

an elongated yarn guide member over which said yarn passes as it is fed from said source to said package;

said elongated yarn guide member having a convexly curved portion over which said yarn is guided as it is wound on said package for compensating for changes in length of the yarn between said source and said package;

an elongated holder spaced from said elongated yarn guide member;

resilient means interposed between said elongated holder and said elongated yarn guide member permitting said yarn guide member to be moved transversely to the direction of travel of said yarn as a result of changes in the tension in said yarn;

said resilient means including:

(i) an elongated leaf spring means;

(ii) means for connecting one side of said elongated leaf spring means to said yarn guide member;

(iii) means for connecting an opposite side of said leaf spring means to said elongated holder so that said leaf

spring means expands and constracts responsive to changes in tension in said yarn; and

(iv) said elongated yarn guide member, said elongated holder and said elongated leaf spring means all being elongated in the same direction;

whereby said device compensates for changes in tension occurring during the winding of yarn on said package resulting from stresses due to changes in the length of said yarn extending between said source and said package and changes in tension during winding resulting from other stresses.

4,169,565
CONTACTLESS WINDING APPARATUS

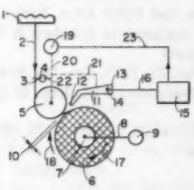
Pieter Blok, Arnhem; Cornelis M. Elenbaas, De Steeg, and Anthony E. J. Doyer, Emmen, all of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.

Filed Jul. 17, 1978, Ser. No. 925,573

Claims priority, application Netherlands, Jul. 22, 1977, 7708149

Int. Cl.[2] B65H *54/02, 54/28, 59/38*

U.S. Cl. 242—18 R **20 Claims**



1. An apparatus for winding a yarn into a yarn package on a tube, which apparatus is provided with a traverse device that runs clear of the yarn package and imparts traverse motion to the yarn in axial direction of the tube, and means positioned near the circumferential surface of the yarn package for pneumatically detecting the distance between the circumferential surface of the yarn package and the traverse device, said detector means comprising a male nozzle connected to a source of compressed air for delivering a main stream and a female nozzle for receiving at least part of the main stream, and a displacement means coupled to said pneumatic detector means and controlled thereby to displace the traverse device as a function of the air pressure in the female nozzle relative to the yarn package as it grows in size, the improvement comprising: element means extending in axial direction of the yarn package which in conjunction with the circumferential surface of the yarn package forms the boundary of a narrow air slit, means for producing an air stream through the air slit tangentially to the yarn package, air channel means in the pneumatic detector means ending in or near the air slit for receiving at least part of the tangential air stream, said male nozzle and female nozzle being positioned for the tangential air stream to cut the main air stream.

14. An apparatus for winding yarn into a yarn package on a tube, which apparatus is provided with a device comprising a drive motor having a variable speed for winding the yarn into a yarn package at a constant speed, characterized in that the device comprises:

(a) two detectors interspaced at a given distance L apart adjacent the yarn path, said detectors generating electrical signals x(t) and y(t), respectively, relative to the movement of the yarn;

(b) correlator means for receiving the signals x(t) and y(t) and supplying an electric signal corresponding to the cross-correlation of the detector signals for a given set value τ of the delay time defined by

$$\tau = \frac{L}{V}$$

where V represents the desired yarn speed;

(c) means for determining whether the cross-correlation has reached its maximum; and

(d) correcting means coupled to said correlator means to correct the speed of the drive motor until the cross-correlation has reached its maximum.

4,169,566
FILM SUPPLY AND TAKE-UP SYSTEM FOR MOTION PICTURE PROJECTOR

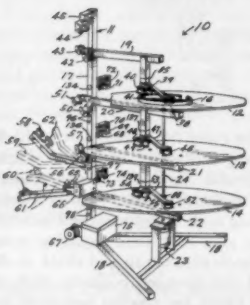
Angelo Boudouris, Sylvania; William D. Petty, Perrysburg, and Clarence S. Simonds, Sylvania, all of Ohio, assignors to Eprad Incorporated, Toledo, Ohio

Continuation-in-part of Ser. No. 617,520, Sep. 29, 1975, Pat. No. 4,010,910. This application Feb. 22, 1977, Ser. No. 770,522

The portion of the term of this patent subsequent to Mar. 8, 1994, has been disclaimed.

Int. Cl.[2] B65H *17/48;* **G03B** *21/00*

U.S. Cl. 242—55.18 **6 Claims**



1. In a motion picture projection system, an improved film transport for supplying film to a projector through which the film is advanced and for taking up film from the projector comprising, in combination, a drive shaft, motor means for rotating said drive shaft at a controlled speed, at least two platter means for carrying coils of film, either one of said platter means selectively functioning as a film take-up platter means for winding a coil of film from the projector and the other of said platter means functioning as a film supply platter means for supplying film to the projector, means for coupling driving power from said rotating drive shaft to both said film take-up platter means and said film supply platter means, means for controlling the rotational speed of said drive shaft for driving said take-up platter means to wind film at the same average rate that such film is advanced through the projector and auxiliary motor means for controlling the speed of said film supply platter means for supplying film at the same average rate that such film is advanced through the projector.

4,169,567
HELICOPTER LIFTING AND PROPELLING APPARATUS

Raymond M. Tamura, 218 Lagoon Dr., Honolulu, Hi. 96819

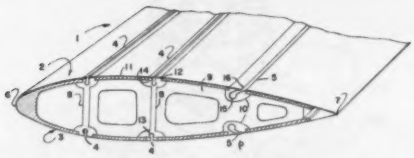
Continuation-in-part of Ser. No. 532,646, Dec. 13, 1974, abandoned. This application Apr. 18, 1977, Ser. No. 788,528

Int. Cl.[2] B64C *21/02*

U.S. Cl. 244—17.11 **21 Claims**

1. Helicopter apparatus comprising a rotor having upper and lower surfaces comprising rotor skin plates extending longitudinally on the rotor and being spaced one from another in chordwise directions, spars extending into the rotor between

the surfaces, ducts extending along inernal sides of the rotor surfaces, the ducts having relatively rigid surface-supporting structure and having outward directed openings extending across the rotor surfaces, interrupting the rotor surfaces between edges of the rotor skin plates, the ducts thereby forming structural elements supporting the rotor skin plates, the outward directed openings of the ducts being arranged perpendicularly to the rotor surfaces in a one portion of the rotor and



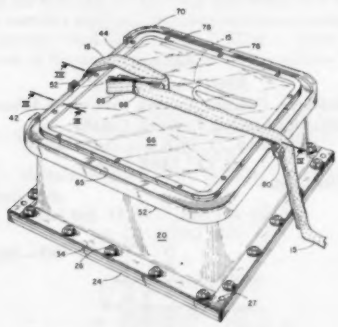
tangential to the rotor surfaces in another portion of the rotor surfaces, suction means connected to the ducts with perpendicualar openings for drawing gas into the ducts through those openings and blowing means connected to the ducts with tangential openings for flowing gas out of the tangential openings, driving means connected to the suction means and to the blowing means for accelerating gas through the suction and blowing means.

4,169,568

HERMETICALLY SEALED PARACHUTE CONTAINER

Gene R. Drew, El Centro; Herman M. Gylseth, Chatsworth; William O. Van Buskirk, Anaheim, and Richard V. Newkirk, Burbank, all of Calif., assignors to The United States of American as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 14, 1977, Ser. No. 851,336
Int. Cl.[2] B64D *17/42*
U.S. Cl. 244—148 **7 Claims**



1. A hermetically sealable personnel parachute container for attaching to an aircrew ejection seat comprising:

a rigid box-like body having a mouth opening to the cavity at one side for receiving a parachute;

means for securing the container to an ejection seat;

a removable flexible diaphragm for closing and sealing the mouth opening;

said flexible diaphragm having the property of elastic memory to enable the container volume to expand and contract with changes in atmospheric pressure;

an outer protective cover detachably secured to the body in spaced relation to the diaphragm to allow said diaphragm to flex with changes in atmospheric pressure;

means for evacuating the sealable container;

releasable clamping means for securing said protective cover and said diaphragm to the periphery of the container;

means operable upon deployment of the ejection seat for releasing the clamping means;

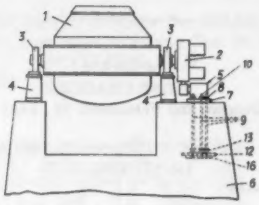
whereby the cover and the diaphragm can be displaced from the body and the parachute deployed from the container cavity.

4,169,569

BASE ANCHORAGE FOR HEAVY MACHINERY

Ernst Riegler, Enns, and Manfred Schmidt, Linz, both of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Mar. 20, 1978, Ser. No. 888,575
Claims priority, application Austria, Apr. 6, 1977, 2404/77
Int. Cl.[2] B23B *17/00*
U.S. Cl. 248—680 **4 Claims**



1. In a base anchorage for heavy machinery, in particular converters, of the type including a base, an anchoring plate concreted into said base and at least one bolt firmly connected with said anchoring plate, said bolt having a lower end, and an upper end projecting out of said base and provided with a screw thread, the improvement comprising:

said anchoring plate having at least one bore provided with a thread;

said at least one bolt being provided with a screw thread at its lower end and being screwed, at said lower end, through said threaded bore of said anchoring plate, said at least one bolt having at least one flattened side at said lower end, and being produced of high-tensile strength material; and

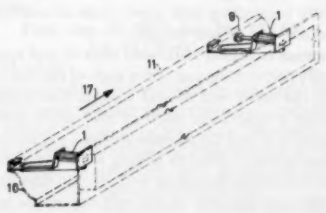
a securing plate fixed relative to said anchoring plate and having a face corresponding to said at least one flattened side of said at least one bolt, said at least one bolt contacting, with said at least one flattened side, said corresponding face of said securing plate, so as to be secured against rotation.

4,169,570

EAVESTROUGH HANGER

Fernand R. Morin, 753 Cartier Dr., Windsor, Ontario, Canada (N9E 1N5)

Filed Sep. 25, 1978, Ser. No. 945,236
Int. Cl.[2] E04D *13/06*
U.S. Cl. 248—48.2 **10 Claims**



1. An eavestrough hanger by means of which standard type eavestrough, equipped with a front rectangular upper rim which terminates into a horizontal reentrant edge, is attached

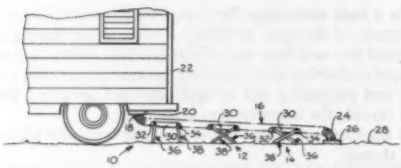
to the wood frame of a building by means of nails; the said nails being lodged in the wood at a downward angle; the heads of said nails being invisible in the front of said eavestrough; and the bodies of said nails being shielded from the action of the elements; said hanger comprising a narrow horizontal strip which is widened at the front and rear ends thereof; the front widened area being bent into an upright rectangular hook consisting of a vertical wall which is in turn bent inwardly into a short horizontal section; said hook being of a dimension to fit snugly into, and be held by a front upper rim of the eavestrough; the horizontal strip at the rear widened area being bent upwardly into a wall which is at an angle to said strip; an open ended tube for holding a nail therein, which extends backwardly from the said angled wall, at a downward angle, and terminates at its other end into a vertical plate which abuts the inside rear wall of the eavestrough when inserted therein.

4,169,571

HOSE CRADLES

William G. Duggan, 280 Fiddleneck St., Lake Isabella, Calif. 93240

Filed Apr. 4, 1978, Ser. No. 893,479
Int. Cl.[2] F16L *3/00*
U.S. Cl. 248—49 **2 Claims**



1. In combination with a flexible hose having one end adapted to be connected to a holding tank at a first elevation and another end adapted to be connected to a sewer at a lower elevation than said first elevation, whereby said hose inclines downwardly from the tank to the sewer, a plurality of hose cradles each comprising:

a one-piece, U-shaped trough having a length of approximately 10–12 inches, a first end and a second end;

a first pair of legs having upper ends and lower ends, each of said upper ends being provided with an aperture, said lower ends being connected together in spaced-apart relation by a bight portion;

a second pair of legs having upper ends and lower ends, each of said upper ends being provided with an aperture, said lower ends being connected together in spaced-apart relation by a bight portion of greater length than the bight portion on said first pair of legs, whereby said first pair of legs will nest inside said second pair of legs;

first means engaging associated ones of said apertures for pivotally connecting said upper ends of said first pair of legs to one end of said trough;

second means engaging associated ones of said apertures for pivotally connecting said upper ends of said second pair of legs to the other end of said trough, said second means including a spacer for each of said upper ends of said second pair of legs for maintaining said second pair of legs in a spaced-apart relation having a greater span than the distance between the upper ends of said first pair of legs, whereby said first pair of legs will nest inside said second pair of legs; and

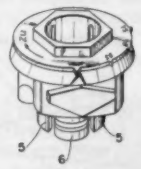
third means for readily and easily maintaining each pair of said upper ends in selected rotated positions, whereby the slope and height of said trough may be varied.

4,169,572

CABLE GROMMET WITH TENSION RELIEF

Hans Simon, Bruchhausener Strasse, 5463 Unkel, Rhein, Fed. Rep. of Germany

Filed Nov. 10, 1977, Ser. No. 850,196
Int. Cl.[2] F16L *5/00*
U.S. Cl. 248—56 **11 Claims**



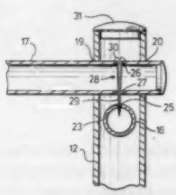
1. A two-part strain relief cable grommet for securing cables in an opening in a carrier member including two tubular outer and inner body members coaxially telescopicably engageable one within the other and rotatable relative to one another, said outer body member being insertable in said opening, said outer body member having less axial extent than said inner body member and having an innner wall surface of generally ellipsoidal contour in cross section, said inner body member including a generally tubular portion divided by axial slits extending over part of its length into four segmental jaws terminating in free ends, the outer surface of two oppositely facing jaws at a location spaced inwardly from their free ends having outwardly extending gradually circumferentially increasing projections engageable against the inner walls surface of said outer body member so that upon relative rotation of said members said two jaws move inwardly towards one another to engage a cable guided through said inner member and said other two oppositely facing jaws having locking cams projecting outwardly from their free ends and engageable with end portions of said outer body member to hold said body members together.

4,169,573

JOINT ASSEMBLY

Murray Frieberg, Concord, Canada, assignor to Liberty Furniture Industries Limited, Concord, Canada

Filed Aug. 22, 1978, Ser. No. 936,264
Int. Cl.[2] F16B *12/40*
U.S. Cl. 248—188 **9 Claims**



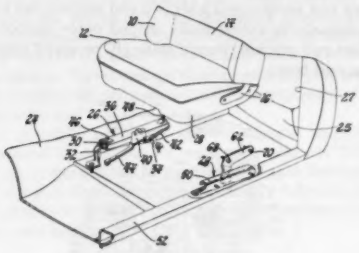
6. An article of furniture comprising at least three tubular legs with adjacent pairs of legs being connected by horizontal members, each leg having a first pair of apertures through which an end portion of one horizontal member extends, and a second pair of apertures spaced along the leg from the first pair of apertures and through which an end portion of another horizontal member extends, and fastening means within each leg engaging the end portions of the said one and another horizontal members and forcing the end portions of the said one and another horizontal members towards one another into firm engagement with the edges of the first and second pair of apertures respectively in the leg.

4,169,574

VEHICLE SEAT MOUNTING ARRANGEMENT

Louis P. Garvey, West Bloomfield; John G. Bobak, Mt. Clemens, and Robert A. Maye, Warren, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 23, 1978, Ser. No. 880,450
Int. Cl.[2] B60N *1/02*
U.S. Cl. 248—429 4 Claims



1. A seat adapted for mounting in a motor vehicle body for seating an occupant therein and comprising:

a seat bottom frame having an outboard side and an inboard side;

a longitudinally extending track assembly adjacent to and connecting for fore and aft longitudinal adjusting movement and providing support of the seat bottom frame at at least two longitudinally spaced points to provide the sole support of the seat bottom frame against forward and rearward pitching movement;

a longitudinally extending track member mounted on the vehicle body adjacent the outboard side of the seat bottom frame; and

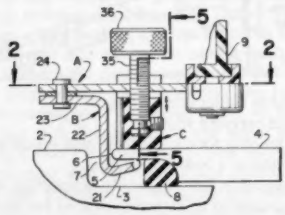
track engaging means carried by the seat bottom frame and slidably interengaged with the track member at only one point to support the outboard side of the seat bottom frame for fore and aft adjusting movement, said outboard track member and track engaging means cooperating with the inboard track assembly to provide a stable tripodal support of the seat bottom frame on the vehicle body.

4,169,575

DETACHABLE ANTENNA MOUNTING BRACKET FOR AUTOMOBILES

Patrick L. Stefano, Parma, Ohio, assignor to Hustler, Inc., Kissimmee, Fla.

Filed Sep. 12, 1977, Ser. No. 832,169
Int. Cl.[2] H01Q *1/32*
U.S. Cl. 248—539 5 Claims



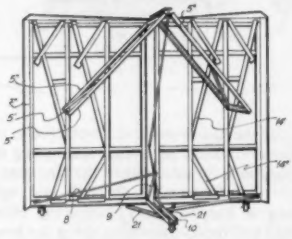
1. A device for detachably mounting an antenna on the trunk lid of an automobile comprised of: a generally flat outer base member and an inner clamping member pivoted relative to said base member about an axis perpendicular to the plane of said base member, said clamping member having a clamping lip spaced from the plane of said base member and being movable from a first normal position where said lip is in spaced, opposed, generally parallel relationship to said base member to a second position wherein said lip is in spaced, non-opposed, relationship to said base member whereby said lip can be inserted into the space between the trunk lid of an automobile and the body thereof without interference from the base member and means threadably supported on said base member for engaging the outer surface of the trunk lid and drawing the lip against the inner surface of the trunk lid thereby clamping said device on said lid said means include a nonmetallic pad having a pair of spaced upstanding legs slidably received by a pair of notches in the edges of said base member and a shaft readily supported in said base member and engaging said pad.

4,169,576

FOLDABLE BEARER STRUCTURE FOR OUTER MOULDS

Dante R. Calderaro, Avellaneda St. 356, 1846 Adrogue (B.A.), Argentina

Filed Dec. 20, 1977, Ser. No. 862,568
Claims priority, application Argentina, Dec. 20, 1976, 265916
Int. Cl.[2] E04G *17/14*
U.S. Cl. 249—188 6 Claims



1. A foldable bearing structure for outer moulding surfaces, the structure comprising, in combination a rigid central portal constituted by a main post, to respective ends of which are fixed, on one and the same side, respective horizontal, coplanar upper and lower beams having their respective free ends secured, by diagonal stays, at a point intermediate said ends of said main post; two side frames hinged along their respective vertical sides one on either side of said main post; a plurality of secondary portals hinged to said frames, said secondary portals being operatively arranged to support upper rectangularly shaped structures hinged along one of their respective smaller sides to said upper beam; respective right-angled triangular shaped structures joined to each of the lower horizontal sides of said side frames, one of the legs of each of said right-angled triangular structures being arranged for nesting in channel means provided in said lower beam.

4,169,577

IRRIGATION PIPE GATE

Harold E. Damratroski, Alda, and Ray H. Morton, Grand Island, both of Nebr., assignors to Traid Fastener Corporation, Alda, Nebr.

Filed Aug. 26, 1977, Ser. No. 827,894
Int. Cl.[2] F16K *3/22*
U.S. Cl. 251—145 13 Claims

1. A longitudinally slidable irrigation pipe gate for opening and closing a longitudinally elongated outlet port in an irrigation pipe having a wall of given finite thickness, said port including a transversely extending lead-end and a trail-end and at least a portion of the outlet port length being of regular transverse width, said pipe gate comprising:

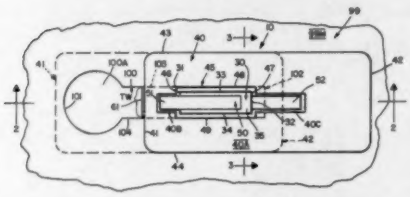
A. a base member comprising an inner-plate for abutting against the inner surface of the pipe and of longitudinal and transverse extents exceeding those of the outlet port, and a boss attached to the inner-plate medial portion of the base member and dimensioned to extend upwardly

through the pipe port, said boss being of regular transverse width at the pipe port, said boss being provided with a transversely extending bridge defining a longitudinally extending bore for said boss;

B. a resilient annular gasket attached along the periphery of the inner-plate for providing a water-tight slidable seal between the inner-plate and the inner surface of the pipe;

C. a cover member having longitudinally extending edges slidably abutting the outside surface of the pipe and having a transverse opening for receiving and non-rotatably surrounding the boss, said cover member having a top-surface including ramp-like depressions extending in both longitudinal directions from the central opening thereof, whereby there is relative vertical movement between the inner-plate and the cover member to accommodate the given finite-thickness of the pipe wall; and

D. spring means for connecting the cover member and the inner-plate and resiliently urging them toward the outside



surface and the inside surface, respectively, of the intervening finite-thickness pipe wall; said spring means being readily insertable for assembly of the pipe gate and readily removable for disassembly thereof, said spring means comprising a longitudinally extending elongated leaf spring, said leaf spring extending along the boss longitudinal bore and being physically disjointed from the base and cover members, said leaf spring including a lead-length and a trail-length compressed downwardly against the respective ramp-like depressions by virtue of the boss bridge bearing downwardly against the leaf spring medial portion whereby said leaf spring resiliently urges the base and cover members toward each other as a slidably associated irrigation pipe gate;

the pipe gate having a closed forward position wherein the base member and gasket completely cover the periphery of the outlet port and an open rearward position wherein a portion of said outlet port is not covered by the base member and gasket.

4,169,578

ROTARY VALVE WITH SPRING BIASED VALVE MEMBER

Ladd M. Adams, Norman, Okla., assignor to Entek Corporation, Norman, Okla.

Continuation-in-part of Ser. No. 606,865, Aug. 22, 1975, Pat. No. 4,072,291. This application Dec. 1, 1977, Ser. No. 856,345

Int. Cl.[2] F16K *5/06, 15/04;* **F16L** *29/00*

U.S. Cl. 251—149.9 **11 Claims**

10. A valve comprising:

a valve body;

a flow passage formed in said valve body;

a first bore extending entirely through said valve body and transversely intersecting said flow passage;

valve stem means journaled in said first bore and having a transverse cavity formed therein aligned normal to the axis of rotation of said valve stem means, and further having an annular reduced diameter portion disposed centrally on said stem means adjacent said cavity for communicating portions of said flow passage located on opposite sides of said bore with each other when said valve is open;

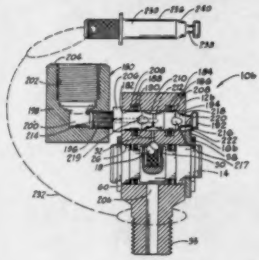
seal means mutually engaging said valve stem means and said first bore for providing fluid-tight communication between said first bore and said flow passage at the intersection therebetween;

valve member means disposed between said transverse cavity and said flow passage when said valve is closed;

a second bore extending through said valve body and transversely intersecting said flow passage, said valve member means being positioned intermediate said second bore and said valve stem means when said valve is closed;

probe means having:

a first end portion and a second end portion and having a substantially cylindrically shaped outer surface on the first end portion thereof slidingly received within said second bore;



an intermediate peripheral surface located between said first and second end portions adjacent said flow passage, said intermediate peripheral surface being an annular reduced diameter surface; and

a passage formed in said probe means communicating between the intermediate peripheral surface and the second end portion of said probe means; and

operator means engaged with said valve stem means for moving said valve stem means relative to said valve body into a position closing said flow passage and, alternately, into a position opening said flow passage.

4,169,579

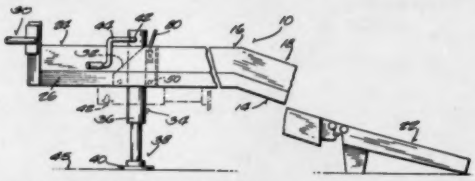
TRUCK TRAILER TONGUE STAND

Jack E. Moll, New Berlin, Wis., assignor to Miller Tilt-Top Trailer, Inc., Milwaukee, Wis.

Filed Mar. 17, 1978, Ser. No. 887,477

Int. Cl.[2] B66F *7/26*

U.S. Cl. 254—45 **6 Claims**



1. A detachable trailer comprising

a mobile load-carrying frame,

a tongue extending forwardly from said frame and adapted to be hitched to a towing vehicle;

a support assembly for selectively supporting said tongue from the ground at an elevation desired for hitching to the towing vehicle, said support assembly including an elongated main support and a ground-engagable base portion adjustably mounted on said main support for relative axial movement;

means mounting said main support on said tongue for pivotal movement of said support assembly relative to said tongue about a generally horizontal axis between a support position wherein said main support extends in a generally vertical direction and said base portion is engagable with

the ground surface and a stowed position wherein the clearance between said support assembly and the ground surface is sufficient for over-the-road travel; and

locking means on said main support and on said tongue for selectively and releasably retaining said support assembly in the support and stowed positions, said locking means including

a pin mounted for reciprocative movement relative to said main support,

means on said tongue defining a pair of apertures for receiving said pin, one of said apertures being situated at a location corresponding to the support position of said support assembly and the other being situated at a location corresponding to the stowed position of said support assembly,

means biasing said pin into releasable engagement with said apertures, and

a lever pivotally supported on said support assembly and connected to said pin for retracting said pin from said apertures against the biasing force of said biasing means and for pivoting said support assembly between the support and stowed positions after said pin has been retracted from said apertures.

4,169,580

HYDRAULIC WINCH FOR SHIPBOARD USE

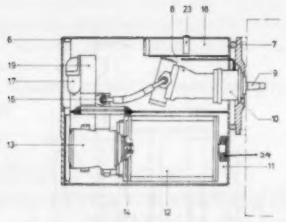
Rolf Hatlapa, Uetersen, and Bernd Horn, Hamburg, both of Fed. Rep. of Germany, assignors to Hatlapa Uetersener Maschinenfabrik GmbH, Uetersen, Fed. Rep. of Germany

Filed Nov. 16, 1977, Ser. No. 851,970

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1976, 2653102

Int. Cl.[2] B66D *3/22*

U.S. Cl. 254—186 R **11 Claims**



1. A hydraulic winch comprising a stationary support housing; a cable drum rotatably supported by said support housing; a mechanical gear transmission disposed in said support housing and having an input shaft and an output shaft connected to said cable drum; a drive housing; a hydraulic motor in said drive housing and having an output shaft connected to said input shaft of said mechanical gear transmission; a hydraulic fluid housing defining a substantially closed hydraulic fluid compartment; a wet-running electric motor in said hydraulic fluid compartment and having an output shaft; a hydraulic pump in said hydraulic fluid compartment and connected to said output shaft of said electric motor; and hydraulic fluid conduits connecting said hydraulic pump to said hydraulic motor, so that said electric motor can drive said hydraulic motor through said hydraulic pump, said stationary support housing supporting said cable drum and accommodating said mechanical gear transmission being upright and having two side walls which are spaced from one another in a horizontal direction, said drive housing accommodating said hydraulic motor being separate from and secured laterally suspended to one of said side walls of said upright support housing, said hydraulic fluid housing accommodating said electric motor and hydraulic pump being also located laterally of said one side wall of said upright supporting housing and secured to the underside of said drive housing to form with the same a unit which can be removed from said support housing and replaced with an electric motor when it is desired to drive said input shaft of said gear transmission electrically rather than hydraulically.

4,169,581

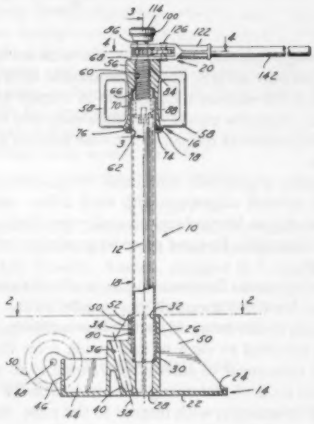
TRAILER STABILIZING JACK

Elmer T. Thurmond, Jr., Miami, Fla., assignor to Equipment Company of America, Hialeah, Fla.

Filed Jun. 21, 1978, Ser. No. 917,605

Int. Cl.[2] B66F *7/26*

U.S. Cl. 254—45 **10 Claims**



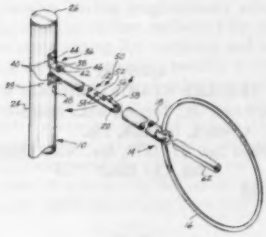
1. A stabilizing jack having a longitudinal vertical axis comprising a base having an upwardly opening axially extending tubular socket, a head axially spaced above said base and having a downwardly opening axially extending tubular socket, said head including an internally threaded bore which is axially aligned with and intersects said downwardly opening socket, an elongated axially extending tubular column having opposing end portions received in the sockets of said base and said head, fastening means at opposite ends of said column for securing said base and said head to said column, an axially extending jack screw assembly having upper and lower portions, said assembly being threadedly carried by said head and having its lower portion axially movable within said column, said jack screw assembly comprising a tubular externally threaded screw member and a generally solid core member which extends through and has a length greater than said screw member, said screw and core members having inner and outer ends, a stop plate located within said column abutting the inner ends of said screw and core members and being secured to said core member, said screw member being threadedly mounted in the threaded bore of said head for axial movement whereby said screw member and said core member move together as a unit relative to said tubular column and said head, said core member having its outer end extending above and being spaced from the top surface of said screw member, a load plate, means for adjustably securing said load plate to the outer end of said core member, and a ratchet and pawl mechanism carried by said core member in the space between the top surface of said screw member and said load plate for rotating said screw member in opposite directions relative to said head and thereby raising or lowering said core member and said load plate.

4,169,582

MESSAGE DELIVERY DEVICE

William J. Coates, 12004 78th Ave. S., Seattle, Wash. 98174

Filed Sep. 1, 1977, Ser. No. 829,934
Int. Cl.[2] B61K *1/00*
U.S. Cl. 258—9 4 Claims



1. A message delivery device for use with an upstanding mast having a base section fixedly anchorable with respect to the ground, a top section telescopable in respect to the base section, and connector means for maintaining said top section in a selected position in respect to the base section, said device comprising:

(a) a plurality of generally horizontal swing arms disposed in spaced vertical alignment with each other, each of said arms having an inboard end pivotally attached to the mast top section, and a free end extending radially outwardly of the mast;

(b) mounting means for mounting each of said swing arms to pivot at least 180°about an axis parallel to the mast, said mounting means being adjustable for applying a selective torque pre-load to each of said swing arms for resisting pivotal movement of each of said swing arms to thereby maintain each of said swing arms in nominally stationary angular orientation with respect to the mast; and,

(c) a message holder for use with each of said swing arms, each message holder including an arcuate hoop and a message tube for receiving messages, each of said tubes including a first end slidably engageable and disengageable with a corresponding swing arm free end to form a telescoping joint therewith, and a second end fixedly attached to said hoop to form a closed ring therewith;

each of said message holders, with a message placed in its corresponding message tube and with the first end of said message tube engaged with a corresponding swing arm, being slidably disengageable from said corresponding swing arm by an operator, moving past the device on a traveling vehicle, extending his arm through said hoop and pulling said message holder from said corresponding swing arm.

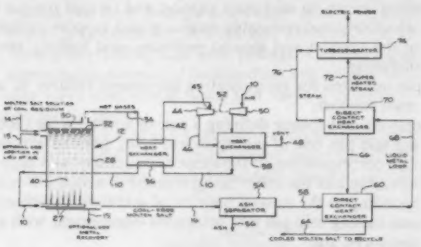
4,169,583

APPARATUS FOR REDUCING ORE

Frank B. Cramer, Mission Hills, Calif., assignor to Clean Energy Corporation, Burbank, Calif.

Division of Ser. No. 619,387, Oct. 3, 1975, Pat. No. 4,033,133, which is a division of Ser. No. 512,540, Oct. 7, 1974, Pat. No. 3,933,128. This application Oct. 19, 1976, Ser. No. 733,848
Int. Cl.[2] C22B *3/02*
U.S. Cl. 266—122 5 Claims

1. Apparatus for the reduction of metal bearing ore with highly aromatic, refractory carbonaceous fuel residuals, said fuel residuals being dissolved in a molten salt solvent therefor, said apparatus comprising a reactor defining a through passage for the fuel residuals solutions, means to disperse metal bearing ore in the solution at temperatures between 600° C. and 1000° C. and in reducing reaction-proximity to said fuel residuals for



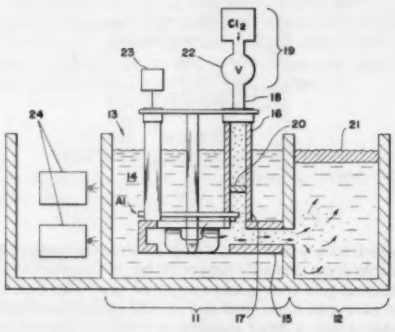
a time sufficient to substantially completely reduce the ore to metal and oxidize the fuel residual to gases.

4,169,584

GAS INJECTION APPARATUS

Mahesh C. Mangalick, Solon, Ohio, assignor to The Carborundum Company, Niagara Falls, N.Y.

Continuation of Ser. No. 816,244, Jul. 18, 1977, abandoned, which is a division of Ser. No. 597,806, Jul. 21, 1975, Pat. No. 4,052,199. This application Aug. 18, 1978, Ser. No. 934,920
Int. Cl.[2] C22B *21/06*
U.S. Cl. 266—214 8 Claims



1. A gas injection apparatus for introducing gas into molten metal, comprising:

(1) a reverberatory furnace;

(2) means within said reverberatory furnace for pumping metal through a metal transfer conduit, said pumping means having a pumping capacity of at least 4000 lbs/min, said metal transfer conduit being at least partially submerged in a metallic bath;

(3) a two-ended gas injection conduit having one end submerged within the metallic bath and connected to the metal transfer conduit, the gas injection conduit being so constructed and arranged that the metal is pumped past the submerged end of the gas injection conduit so as to contact the gas within the gas injection conduit connected to the metal transfer conduit, the gas injection conduit having an unsubmerged end opposite the submerged end of the gas injection conduit; and

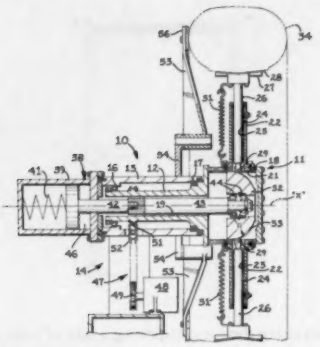
(4) means for providing gas to be introduced into the molten metal into the unsubmerged end of the gas injection conduit.

4,169,585

WORKPIECE HOLDER

Ronald E. Dennis, Peoria Heights, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 3, 1978, Ser. No. 883,102
Int. Cl.[2] B23Q *3/14*
U.S. Cl. 269—48.1 **12 Claims**



1. A workpiece holder for supporting an annular workpiece having an inner surface, comprising:

a support structure having a longitudinal axis;

a plurality of elements having inner and outer end portions and being slidably maintained by said support structure;

a cam engaging said inner end portions of said elements and being movable along the longitudinal axis between a first position at which the elements are at a retracted position and a second position at which the elements are extended into engagement with said inner surface of the workpiece;

means for moving the cam between said first and second position; and

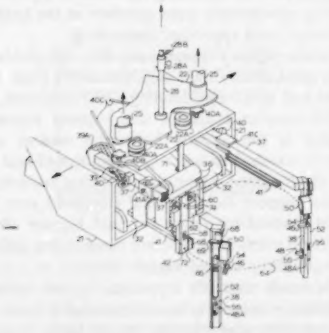
a bearing rotatably connecting said cam moving means to said cam.

4,169,586

AUTOMATIC DEVICE FOR STACKING CIRCULAR WORKPIECES

Jack Tarosky, Apollo, Pa.; Melvin R. Fahnestock, Parkersburg, W. Va., and Leonard J. Flowers, Oakmont, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 12, 1977, Ser. No. 859,581
Int. Cl.[2] B65H *29/34, 29/50*
U.S. Cl. 271—1 **6 Claims**



1. A device for receiving circular workpieces from a transversely movable conveyor and for stacking said workpieces upon a surface located beneath the device in a plurality of generally vertical, side-by-side columns without interrupting transverse movement by the conveyor, comprising:

(a) receiving means for initially receiving workpieces from said conveyor, said receiving means including a guide for directing transfer of workpieces from said conveyor to a plurality of vertical arms in the device; and

(b) a plurality of vertical arms spaced laterally of one another by a distance generally corresponding to the breadth of the workpieces, each of said arms including:

(1) a finger selectively movable between a first inwardly directed position wherein said finger temporarily supports workpieces, and a second out-of-the-way position wherein workpieces temporarily supported by said finger are dropped downwardly along said arms;

(2) means for selectively moving said finger from its first position to its second position;

(3) a tongue spaced downwardly of said finger, said tongue being selectively movable between a first, inwardly directed position wherein said tongue accumulates workpieces between said arms, and a second out-of-the-way position wherein workpieces accumulated between said arms fall downwardly together guided by the arms to form a neat stack on a surface located beneath the device; and

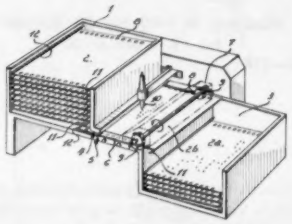
(4) means for selectively moving said tongue from its first position to its second position.

4,169,587

PROCESS FOR TRANSFERRING SUPPORTS, AND SUPPORTS FOR USE THEREIN

Ludwig Stark, Maeder, Austria, assignor to Vespa Instruments Establishment, Vaduz, Liechtenstein

Filed May 17, 1977, Ser. No. 797,735
Claims priority, application Switzerland, May 24, 1976, 6517/76
Int. Cl.[2] B65H *5/00*
U.S. Cl. 271—264 **11 Claims**



1. A process for transferring supports, characterized by the fact that a support is mechanically driven by means of a driven device and that said mechanically driven support drives at least the next support by means of at least a fold formed on at least a part of the rear border width of said support and coming during its travel motion into coupling with at least another fold, which is formed in the opposite direction to said rear border fold of the previous support, and on at least a part of the fore border width of said next support.

4,169,588

ELECTRONICALLY CONTROLLED EXERCISING MACHINE

Donald C. Miffitt, Chelmsford, and Angelo Tortola, Waltham, both of Mass., assignors to The Gillette Company, Boston, Mass.

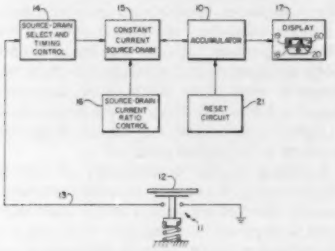
Filed Dec. 5, 1977, Ser. No. 857,374
Int. Cl.[2] A63B *23/04*
U.S. Cl. 272—70 **10 Claims**

1. An electronically controlled exercising machine comprising:

switching means including a pulse generating means for generating pulses when activated by an exerciser;

display means including a fixed reference character and a movable character;

accumulator means for providing a signal to position said movable character of said display means indicative of the



cumulative rate of pulses from said pulse generating means; and

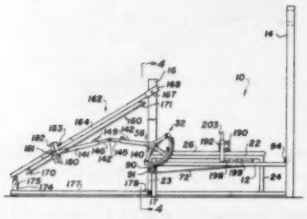
circuit means including constant current source-drain circuitry electrically coupled to said switching means and said accumulator means for charging and discharging said accumulator means in a linear manner.

4,169,589

LEG EXERCISING APPARATUS

James A. McArthur, 1947 Penny Pl., Port Coquitlam, B.C., Canada

Filed Sep. 28, 1977, Ser. No. 837,460
Int. Cl.[2] A63B *21/00*
U.S. Cl. 272—118 24 Claims



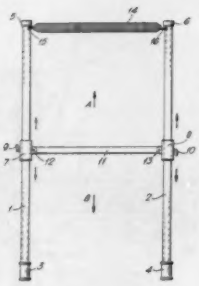
1. Apparatus for use by human beings to exercise their legs, comprising an elongate frame, a support on said frame upon which a person can lie out flat lengthwise of said frame, and an exercise unit comprising an elongate side member extending lengthwise of said frame and formed in inner and outer sections, first means pivotally connecting adjacent ends of said inner and outer sections together, second means pivotally connecting an outer end of the inner section to the frame and positioned where the hip joints of a person lying on his back on the support in a position lengthwise of said frame are substantially horizontally alignable therewith, a foot pedal near an outer end of the outer section upon which said person's foot can rest with his leg extending along the side member in a direction lengthwise of said frame, and resistance means connected to said outer end of the inner section to resist movement of said inner section around said second pivot means.

4,169,590

EXERCISING DEVICE

Johan K. Johansen, 9090 Burfjord, Burfjord, Norway

Filed Apr. 28, 1978, Ser. No. 901,061
Int. Cl.[2] A63B *21/02*
U.S. Cl. 272—142 2 Claims



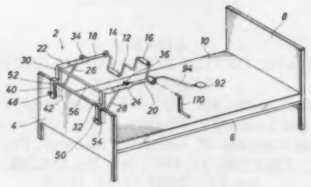
1. An exercising device comprising a pair of rods, a connecting member, a pair of pivot means each pivotably connecting one of the opposite ends of said connecting member to a corresponding one of said rods, and spring means joining said rods to each other at one of their ends, characterized in that each of said pivot means is separately displaceable along substantially the entire length of its corresponding rod.

4,169,591

EXERCISE DEVICE FOR INVALIDS

Ormond S. Douglas, 108 E. Barrow, Dayton, Tex. 77535

Filed Dec. 5, 1977, Ser. No. 857,130
Int. Cl.[2] A63B *23/04*
U.S. Cl. 272—144 8 Claims



1. An apparatus for exercising the limbs of a person lying in a bed having substantially rigid members at the head and foot portion thereof, said apparatus comprising:

an adjustable support frame removably attachable to either of the substantially rigid members at the head or the foot of said bed, said frame defining a pair of spaced, generally parallel support elements, said support elements being oriented in substantially horizontal manner when said frame is attached to said rigid members of said bed;

a pair of elongated support arms being received by said parallel support elements, said elongated arms being adjustably extendable relative to said support elements for horizontal positioning, bearing means being defined at the free extremities of said support arms;

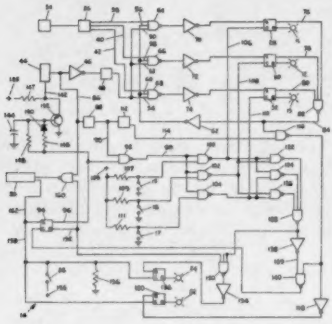
a double crank rotatably supported by said bearing means and being positionable by said adjustable frame in a position reachable and rotatable by the limbs of said person; and

brake means being defined by one of said bearing means for adjusting the force required for rotation of said double crank.

4,169,592
ELECTRONIC REFLEX GAME

David J. Hall, 18104 Lovell Rd., Spring Lake, Mich. 49456

Filed Feb. 22, 1977, Ser. No. 770,667
Int. Cl.[2] A63F 9/06; A61B 5/16
U.S. Cl. 273—1 E 19 Claims

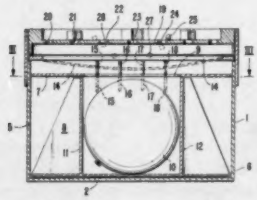


1. An electrically operated game apparatus comprising:
a plurality of visual stimuli indicators;
a corresponding number of manually operable switch means;
means for actuating the stimuli indicators in an indeterminate random sequence for predetermined periods of time;
means in the electrical circuit operably coupling each stimuli indicator with a switch means for electrically deactuating a stimuli indicator when a corresponding switch means is operated;
means in the electrical circuit for disabling at least a portion of the electrical circuit for ending the game played with the apparatus in the event that a stimuli indicator remains actuated at the end of a predetermined period of time;
manually operative means for resetting the disabling means and for restarting the game apparatus; and
means operably coupling the switch means with the disabling means for actuating the disabling means when two or more switch means are simultaneously operated.

4,169,593
BALLOON BURSTING GAME

Arthur R. Wood, P.O. Box 1676, Kingston, Ontario, Canada (K7K191)

Filed May 12, 1978, Ser. No. 905,149
Int. Cl.[2] A63F 9/00
U.S. Cl. 273—1 R 1 Claim



1. A game, comprising
a container of substantially rectangular parallelepiped configuration having a bottom, a first pair of spaced substantially parallel sides substantially perpendicular to the bottom and a second pair of spaced substantially parallel sides substantially perpendicular to the bottom and to the first pair of sides;
a first partition in the container extending between the sides thereof spaced from and substantially parellel to the bottom and forming a chamber, said first partition having a hole formed therethrough in the area of the center thereof;
an inflated balloon in the chamber;
a substantially elastic second partition in the container extending between the sides thereof above the first partition and spaced from and substantially parallel to said first partition;
a plurality of needles affixed to said second partition and extending substantially perpendicularly therefrom into the hole of said first partition;
a third partition in the container extending between the sides thereof above said second partition and spaced from and substantially parallel to said second partition, said third partition having a plurality of mutually spaced holes formed therethrough of sufficient diameter to pass marbles; and
a plurality of marbles dropped by players through the holes through the third partition whereby when a sufficient number of marbles rest on said second partition the weight thereof stretches the center area of said partition downward sufficiently to force a needle thereof through the hole through said first partition into said balloon thereby bursting said balloon.

4,169,594
HOLLOW ARTICLES

John C. Crane, Links View, England, assignor to The Mettoy Company Limited, Northampton, United Kingdom

Filed Sep. 9, 1977, Ser. No. 831,930
Claims priority, application United Kingdom, Sep. 16, 1976, 38438/76
Int. Cl.[2] A63B 41/00; B28B 1/02; B32B 7/02
U.S. Cl. 273—58 BA 18 Claims

1. A hollow article having a flexible wall consisting of laminated material comprising an outer first layer of thermoplastic synthetic resin material and an inner second layer comprising first and second thermoplastic synthetic resin materials; said first material having a tensile strength greater than said material of said first layer and said second material being exposed at one surface of said second layer and being bonded to the adjacent face of said first layer, and wherein each of said first and second materials form respective lattice structures which are mechanically interlocked, the material of one said structure filling the interstices of the other said structure.

3. A hollow article according to claim 1, wherein said flexible wall is in the form of a playball.

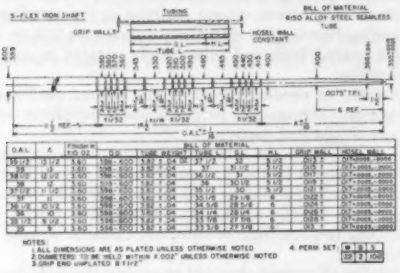
4,169,595
LIGHT WEIGHT GOLF CLUB SHAFT

Eugene Kaugars, Torrington, Conn., assignor to Brunswick Corporation, Skokie, Ill.

Filed Jan. 19, 1977, Ser. No. 760,518
Int. Cl.[2] A63B 53/12
U.S. Cl. 273—80 R 15 Claims

1. A light weight metal golf club shaft having performance and playing characteristics similar to conventional weight carbon steel alloy shafts, the shaft weight having the relationship to clubhead type and shaft flex shown in Table 1 wherein

the shaft consists essentially of a metal wherein the metal has, after heat treatment, a yield strength equal to or greater than



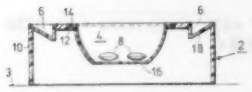
220,000 lbs./in.^{2} and an ultimate strength equal to or greater than 240,000 lbs./in.^{2}.

4,169,596

BOARD GAME INCLUDING THROWABLE PLAYING PIECES

Benjamin Chinenson, Hata'as St. 24, Givatayim, Israel

Filed Oct. 12, 1977, Ser. No. 841,291
Int. Cl.^{2} A63F *9/02*
U.S. Cl. 273—95 R **6 Claims**



1. A game, comprising: a board of flat sheet material formed with depending walls adapted to rest on a flat horizontal surface with the center portion of the board spaced from said surface; a cup-shaped member located at the center portion of the board and depending therebelow with the rim of the cup-shaped member substantially flush with the board, and with the bottom of the cup-shaped member suspended above the horizontal surface; a plurality of pockets, one for each player, for holding playing pieces, said pocket being located along the outer margins of the board; and a plurality of playing pieces having the same configuration, each playing piece including a curved external surface to enable two of the playing pieces to be held together in substantially point contact at their curved surfaces and to be thrown together against an inner wall of the cup-shaped member in an attempt to have one playing piece remain in the cup and the other to bounce out of the cup; said cup-shaped member having a depth many times the size of said playing pieces.

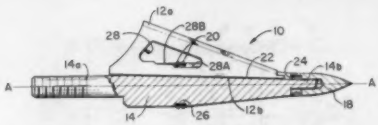
4,169,597

BROADHEAD ARROW HEAD

Richard C. Maleski, c/o Wasp Archery Products, P.O. Box 760, Bristol, Conn. 06010

Filed Oct. 17, 1977, Ser. No. 842,729
Int. Cl.^{2} F41B *5/02*
U.S. Cl. 273—106.5 B **8 Claims**

6. For releasable attachment to an arrow shaft, a broadhead arrow head comprising a generally cylindrical body having a pointed end and an opposite end releasably attachable to the arrow shaft, the body having an axially extending slot and a circumferentially extending locking groove intersecting the slot, the slot being of greater depth than the locking groove at their intersection, annular locking means in the locking groove, and a replaceable blade longitudinally movable in the slot between a mounting position and a lock position, the blade in lock position being positively fixed longitudinally within the slot when the body is secured to the arrow shaft, the blade including a mounting opening having an inside edge and a stepped trailing edge in raised adjacent relation to said inside



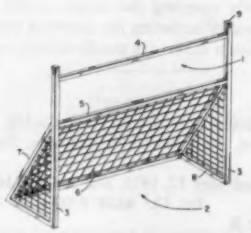
edge, said inside edge being located below the surface of the locking groove at its intersection with the slot when the blade is in mounting position, and the stepped trailing edge being located above the surface of the locking groove at its intersection with the slot when the blade is in lock position.

4,169,598

DOUBLE PURPOSE GOAL STRUCTURE

Lawrence H. Taylor, P.O. Box 49-58, 48th St.,, Union City, N.J. 07087

Filed Jun. 8, 1976, Ser. No. 693,747
Int. Cl.^{2} A63B *71/02*
U.S. Cl. 273—127 B **1 Claim**



1. A dual purpose goal structure to be used with its widest dimension facing the field of play comprised of a pair of vertical side posts with a lateral crossbar interconnecting said side posts to form the top of a caged area suitably equipped with netting to prevent the pass-through of a game ball that might be driven into this netted lower cage area for score, and with said crossbar also serving as the bottom member of a further, but different ball pass-through scoring area above the said lower cage area, circumscribed by the said cross bar forming the top of the lower cage area on the bottom, and the said vertical side posts on the sides, and a further lateral crossbar on the top of the ball pass-through scoring area interconnecting the said side posts, with such upper ball pass-through scoring area not being provided with a netted retaining structure, as in the lower area, so as in the second case, to freely permit the pass-through of a game ball for score, thus providing players, of substantially a kick ball game, with two alternate optional scoring means in a single goal structure, particularly adapted to such alternate playing and scoring use.

4,169,599
TWO-PIECE SOLID GOLF BALLS

Ryota Fujio; Motozumi Kitayama, both of Akigawa; Fumio Odaka, Kawagoe; Takashi Nyomura, Kodaira, and Shiro Anzai, Higashi-Murayama, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Jun. 16, 1977, Ser. No. 807,274
Claims priority, application Japan, Jun. 16, 1976, 51-69675
Int. Cl.[2] A63B *37/02, 37/12*
U.S. Cl. 273—220 **13 Claims**

1. A two-piece solid golf ball comprising a solid core and a cover enclosing the core, said core being obtained by curing a composition comprising

(a) 100 parts by weight of polybutadiene containing at least 40% of cis-1,4 configuration,

(b) 9–20 parts by weight of a polyfunctional unsaturated ester being selected from the reaction products of an acid selected from the group consisting of acrylic acid and methacrylic acid with an alcohol selected from the group consisting of di-hydric alcohols, tri-hydric alcohols and tetra-hydric alcohols

(c) 5–10 parts by weight of an acid selected from the group consisting of methacrylic acid, acrylic acid and mixtures thereof, the total amount of the ingredients (b) and (c) being 15–30 parts by weight and the weight ratio of the ingredient (b) to the ingredient (c) being within the range of 55/45–80/20,

(d) 20–80 parts by weight of a zinc compound which reacts with the ingredient (c) to form crosslinkage by metal ion bonding, wherein the amount of the zinc compound exceeding 10 parts by weight based on 100 parts by weight of the ingredient (a) acts as a filler to adjust the weight of the golf ball, and

(e) 0.5–5 parts by weight of an alkyl peroxide, and said cover comprising

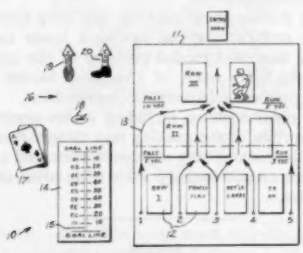
(f) 100 parts by weight of a metal salt of a copolymer of ethylene and unsaturated carboxylic acid, said metal salt having a loss tangent of lower than 0.08, and

(g) 1–5 parts by weight of an inorganic filler.

4,169,600
FOOTBALL SIMULATION GAME WHEREIN STANDARD PLAYING CARDS ARE USED

Julius B. Rakowski, 6933 Glenheights Rd., Baltimore, Md. 21215

Filed Nov. 16, 1977, Ser. No. 852,095
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—247 **8 Claims**



1. A football simulation game, comprising:

a game board having a series of rectangles imprinted thereon comprising a first row having a plurality of rectangles therein,

a second row having a plurality of rectangles therein,

and a series of directional lines imprinted on said board between said rectangles, at least one of said lines extending from adjacent a rectangle in said first row and branching in directions to both sides of a rectangle in said second row, and least one other of said lines extending from adjacent a rectangle in said first row in a direction generally toward a rectangle of said second row, said lines representing simulated defensive football player positions;

a score keeper device to indicate the location of the simulated football from play to play during the game as played on said game board;

a deck of playing cards for use as simulated defensive players on said game board, for determining simulated kick distances during play, for determining strength of simulated offensive player versus simulated defensive players on said game board, and for differentiating between a simulated pass and a simulated run;

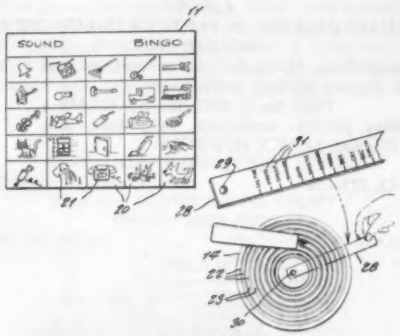
a playing piece to represent a pass play; and

a playing piece to represent a running play.

4,169,601
SOUND BINGO

Richard D. Frischmann, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of New York, N.Y. 10007

Filed Mar. 7, 1977, Ser. No. 774,907
Int. Cl.[2] A63F *3/06*
U.S. Cl. 273—269 **2 Claims**



1. A sound bingo game comprising in combination a set of cards, each imprinted with horizontal and vertical rows of spaces, each space having illustrations of objects that produce a specific sound, a quantity of discs or chips for selectively covering said spaces, and a set of phonograph records each having a collection of sounds recorded thereupon in sequence, said cards each having differentially arranged certain of said illustrations which each said record has a differently arranged certain of said sounds, wherein said game includes a means for checking a players play for correctness, wherein said means comprises a phonograph having a row of spaces thereupon receiving a calibrated scale, identified with names of sounds, and a needle operated by a mechanism of said phonograph traveling across said row of spaces and calibrated scale.

4,169,602
PREFABRICATED BOWLING LANE

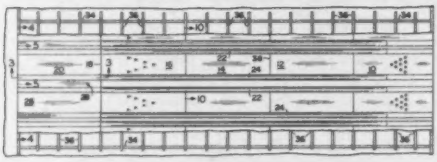
Will Heddon, P.O. Box 1127, Lake Wales, Fla. 33853

Filed May 12, 1978, Ser. No. 905,216
Int. Cl.[2] A63D *1/04*
U.S. Cl. 273—51 **23 Claims**

1. In a bowling alley having a plurality of lanes, a pair of gutters adjacent each lane, leveling strips positioned below and

perpendicular to the lane, and lane support structure positioned below the leveling strips and parallel to the lane, a plurality of prefabricated lane modules which form a complete bowling lane when installed end to each, each lane module comprising:

(a) a base;



(b) a panel formed from a plurality of laminated hardwood strips joined side to side, said panel being bonded to the upper surface of said base and having a width greater than the width of said base to form a female notch along each side of said lane module for securing one side of each adjacent gutter to said lane module; and

(c) securing means for attaching said lane module to the lane support structure.

4,169,603

SHAFT PACKING, IN PARTICULAR FOR USE IN COLLOID MILL

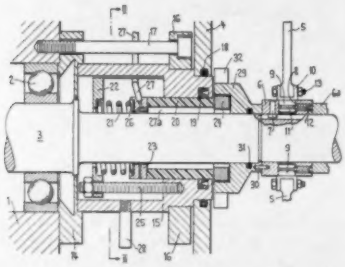
Friedrich Funk, Matzendorf, Switzerland, assignor to Meyer AG Zuchwil, Zuchwil, Switzerland

Filed Jun. 7, 1977, Ser. No. 804,349

Claims priority, application Switzerland, Jun. 9, 1976, 7237/76; Apr. 13, 1977, 4552/77

Int. Cl.[2] F16J *15/34*

U.S. Cl. 277—59 **20 Claims**



1. A shaft packing for a shaft that extends into a vessel of a mill, such as an agitating mill and a colloidal mill, the shaft and vessel being mounted for rotation relative to each other, said shaft packing comprising

a shaft packing housing;

a sliding ring;

a counter ring mounted in sealing engagement with said sliding ring;

wherein one of the said sliding and said counter rings is mounted on the shaft and the other is fixed with respect to the vessel, and one is made of a hard material having a Vickers hardness of at least 1000 kp/mm^2 and the other is made of a soft material having a maximum hardness of 100 Shores; and

further comprising means for displaceably and adjustably mounting said counter ring, said mounting means being in turn mounted on said housing such that said counter ring can be displaced and adjusted from outside the vessel without having to dismantle the shaft packing;

means for applying spring pressure to press said counter ring against said sliding ring;

means for supplying a cooling and lubricating liquid to said sliding and counter rings at the surfaces thereof in contact with each other; and

a sliding ring holder having at least one end face for mounting said sliding ring, said holder having protecting means mounted thereon for keeping the material to be milled and the milling bodies, if used in the mill, away from the contacting surfaces of said sliding and counter rings.

4,169,604

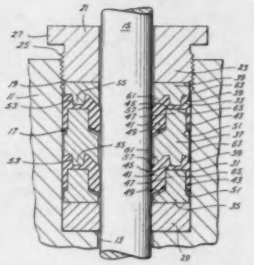
ROD SEAL

Joe W. Heathcott, 5135 Grape, Houston, Tex. 77096

Filed Apr. 19, 1978, Ser. No. 897,581

Int. Cl.[2] F16J *15/18*

U.S. Cl. 277—125 **21 Claims**



1. Rod seal packing assembly comprising

a packing ring having inner and outer annular peripheral portions including seal means to seal with a rod extending therethrough and a box thereabout respectively, and an annular medial portion between said peripheral portions connecting them together to form a unitary ring, and

upper and lower ring shaped compression means, respectively above and below said packing ring, including medial portions for engaging said medial portion of the packing ring,

said medial portions of said packing ring and said compression means including stress control means for creating a reaction force to restrain further compression of the assembly after a certain degree of compression of the assembly has been achieved,

said medial portion of the packing ring being made of compressible resilient material having a lower modulus of elasticity than said medial portions of the compression means which are made of a material harder than said packing ring and relatively incompressible,

said stress control means including a thin portion in said medial portion of the packing ring thinner than the portions of the packing ring adjacent thereto and a protuberant portion on said medial portion of an adjacent compression means.

4,169,605

SHAFT SEALING MEANS FOR HIGH PRESSURE FLUID

Takashi Nishimoto; Seiichi Suzuki, and Hiroyoshi Takamori, all of Toyama, Japan, assignors to Kabushiki Kaisha Fujikoshi, Toyama, Japan

Filed Nov. 28, 1977, Ser. No. 855,227

Claims priority, application Japan, Dec. 7, 1976, 51/163631[U]

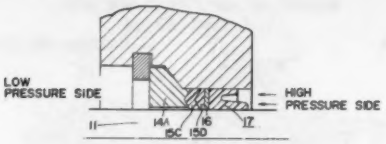
Int. Cl.[2] F16J *15/32*

U.S. Cl. 277—188 A **10 Claims**

1. A shaft sealing means for use in a hydraulic pump/motor including a body having high and low pressure sides, a rotary shaft rotatable within said body, an oil seal fitted in the gap

between said rotary shaft and said body for sealing therebetween and between said high and low pressure sides, and a spacer fixed in said gap, said means comprising:

anti-protrusion means fitted relatively tightly in said gap with its high pressure side surface in close contact with the low pressure side surface of said oil seal to prevent protrusion of said oil seal toward said low pressure side; and



anti-friction means inserted in the gap between said anti-protrusion means and said spacer to provide a sliding motion between said spacer and said anti-protrusion means whereby said anti-protrusion means and said oil seal may be rotated slightly around said rotary shaft as said shaft rotates thereby reducing the generation of frictional forces between said oil seal and said spacer.

4,169,606

WORKBENCHES

Ronald P. Hickman, Waltham Abbey, England, assignor to Inventec International Limited, Point Robert, Channel Islands

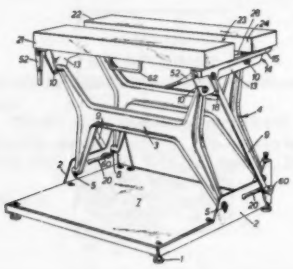
Division of Ser. No. 642,743, Dec. 22, 1975, Pat. No. 4,076,299, which is a continuation of Ser. No. 495,265, Aug. 7, 1974, abandoned, which is a division of Ser. No. 177,123, Sep. 1, 1971, Pat. No. 3,841,619, which is a division of Ser. No. 803,600, Mar. 3, 1969, Pat. No. 3,615,807. This application Oct. 28, 1977, Ser. No. 846,574

Claims priority, application United Kingdom, Mar. 4, 1968, 10484/68

The portion of the term of this patent subsequent to Feb. 20, 1996, has been disclaimed.

Int. Cl.[2] B25B *1/10*

U.S. Cl. 269—139 **5 Claims**



1. A portable, collapsible workbench of a size to be carried by hand in a collapsed, compact condition to a site of use by an individual and there folded erect as a rigid, free-standing structure affording a stable working surface, comprising:

front and rear, laterally elongated vise members, the upper surfaces of which are substantially flat and substantially co-planar and which together form the working surface of the workbench, laterally elongated edges of said vise members being arranged in side-by-side facing relation to provide workpiece clamping surfaces extending over the full lateral extent of said vise members, the width of each vise member in the front-to-rear direction being larger than the depth of said laterally elongated edge thereof such that said each vise member, together with the other vise member, affords a working surface of substantial front-to-rear extent;

support means providing laterally spaced-apart bearing surfaces underlying said vise members in the front-to-rear direction, said bearing surfaces being located adjacent to, but laterally inward of, the ends of said vise members;

means, including a pair of laterally spaced-apart front-to-rear extending vise operating devices operatively coupled between said support means and at least one of said vise members, for positively moving one of said vise members along said bearing surfaces towards and away from the other vise member to enable a workpiece to be clamped between said clamping surfaces, said moving means being clear of said clamping surfaces such that said clamping surfaces when spaced-apart define therebetween a gap which is unobstructed over the full lateral extent of said vise members and which is open at both ends thereof;

means linking said vise members to said support means for preventing substantially any movement of said vise members out of the plane of said working surface; and

collapsible support means, including front laterally spaced-apart legs and rear laterally spaced-apart legs pivotally connected to said support means, for folding between an erect condition, in which said front and rear legs are spaced apart in the front-to-back direction and extend generally downward from said support means to support said bench top working surface in a generally horizontal plane at a convenient working height, and a collapsed condition, in which said front and rear legs extend generally parallel to said working surface in juxtaposition to said support means to form a compact configuration adapted to be carried by hand by an individual.

4,169,607

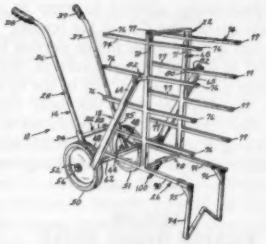
BEDDING PLANT TRANSPORT DEVICE

C. Harris Reese, Hallock, Minn.

Filed Apr. 10, 1978, Ser. No. 894,987

Int. Cl.[2] B62B *1/02*

U.S. Cl. 280—47.19 **12 Claims**



1. A device for transporting articles, comprising:

a generally L-shaped main frame including an upwardly and rearwardly extending elongated handle portion and a bottom support portion connected to said handle portion and having a free end;

wheel means rotatably mounted on said main frame near a juncture of said handle portion and said support portion for rotation about a generally horizontal axis, said handle portion being movable about said axis through an arc between a lower transporting position and a higher resting position;

a second frame rigidly mounted on said main frame at said free end of said support portion and extending generally upwardly therefrom, said second frame including carriage support means adjacent said free end;

an article carrying frame suspended from said second frame, said article carrying frame including a main portion having a top and a bottom end, and at least one article carry-

ing member associated with said main portion to support the articles; and

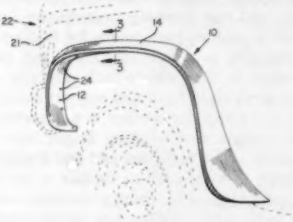
a bottom support carriage including a bottom portion connected to said main portion of said article carrying frame and extending generally horizontally so as to rest on said carriage support means when said handle portion is moved to said resting position, and a ground engaging member connected to said bottom portion and extending generally downwardly therefrom so as to provide further support for said article carrying frame when said handle portion is moved to said resting position.

4,169,608

FENDER EXTENSIONS

Gerald A. Logan, Portland, Oreg., assignor to L.T.D. Enterprises, Inc., Portland, Oreg.

Filed Jan. 16, 1978, Ser. No. 869,917
Int. Cl.[2] B62D *9/16*
U.S. Cl. 280—153 R **11 Claims**



1. In a fender extension,

a cover portion,

and a curved inner flange portion integral with the cover portion and forming an outwardly extending hollow angle with the cover portion,

the inner flange portion having fastener portions extending beyond the cover portion and adapted to be secured to an inwardly turned flange of a fender,

the flange portion being adapted to press an edge of the cover portion against the side of the fender,

the cover portion and the inner flange portion being generally V-shaped in transverse cross-section, the cover portion, the flange portion and the side of the fender defining a hollow space therebetween, the inner flange portion being generally curved so that it conforms to the bottom of the fender and the fastener portions adapted to be secured to the bottom of the inturned flange of the fender.

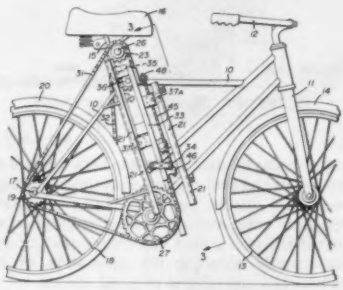
4,169,609

BICYCLE WHEEL DRIVE

George P. Zampedro, 1034 Mercer St., N.E., Warren, Ohio 44483

Filed Jan. 26, 1978, Ser. No. 872,725
Int. Cl.[2] B62M *1/04*
U.S. Cl. 280—241 **6 Claims**

1. A wheel drive for a bicycle having a frame rotatably supporting the axles of front and rear bicycle wheels including dual track means secured to the opposite sides of said frame and arranged at an angle from vertical, a carriage arranged for longitudinal movement in each of said track means and a pedal on each of said carriages in oppositely disposed outwardly extending relation, a pair of sprockets journaled on said frame above said track means and a second pair of sprockets journaled on said frame adjacent the lower ends of said track means, a rear wheel sprocket on said rear wheel and a first bicycle chain trained over said rear wheel sprocket over one of said sprockets on the upper portion of said frame and over one of said sprockets adjacent the lower ends of said track means with a section of said first bicycle chain being positioned in parallel relation to one of said track means, a one-way ratchet having a sprocket configuration mounted on one of said carriages, said sprocket engaged in said parallel section of said first bicycle chain, said ratchet and sprocket arranged to lock to said carriage when rotated in one direction and to rotate freely when rotated in the opposite direction, a second bicycle chain trained over the other one of said sprockets on the upper portion of said frame and over the other one of said sprockets adjacent the lower ends of said track means, a section of said



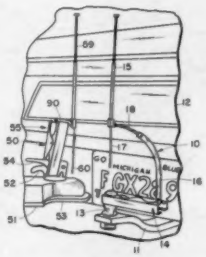
second bicycle chain being positioned in parallel relation to a second carriage in the other one of said track means on the other side of said frame and a second one-way ratchet and sprocket on said second carriage with said sprocket engaging said second bicycle chain, whereby alternate reciprocal motion imparted said pedals will move said first and second bicycle chains so as to rotate said rear wheel sprocket and the rear wheel.

4,169,610

TRAILER ALIGNMENT DEVICE

Frederick J. Paufler, 3334 Badger, S.W., Wyoming, Mich. 49509

Filed Mar. 6, 1978, Ser. No. 883,892
Int. Cl.[2] B60D *1/06*
U.S. Cl. 280—477 **10 Claims**



1. A vehicle alignment device for aligning the hitch of a towing vehicle to that of a towed vehicle in which one such device is used on each of the vehicles, said alignment device comprising:

clamp means for attachment to a vehicle hitch;

a vertically extendible rod;

means for adjustably coupling said rod to said clamp means for orienting said rod in a generally vertical direction comprising at least one arm pivotally coupled to said clamp means and including means for slidably holding said rod permitting compact storage of said alignment device; and

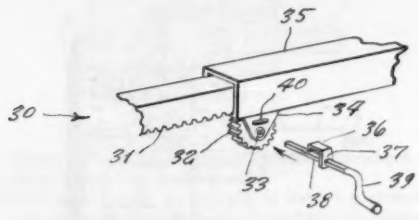
freely hanging alignment means extending from a lower end of said vertically extendible rod permitting visual align-

ment of said rod in a vertical direction by aligning said rod with said alignment means.

4,169,611
TRAILER TONGUE EXTENSION

Dentis M. Smith, c/o George Spector, 3615 Woolworth Bldg., 233 Broadway, and George Spector, 3615 Woolworth Bldg., 233 Broadway, both of New York, N.Y. 10007

Filed Mar. 7, 1977, Ser. No. 774,909
Int. Cl.[2] B60D *1/14*
U.S. Cl. 280—482 **1 Claim**

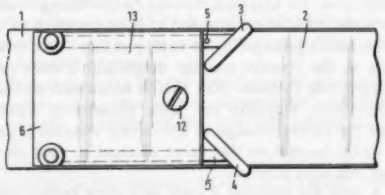


1. A trailer tongue extension, comprising in combination, an inner tongue, said inner tongue having a trailer hitch at its forward end for connection to a towing vehicle, and said outer tongue protrudes forwardly from a boat trailer to which it is affixed, said tongues having tubular square cross-sections fitting slidably in telescopic relationship wherein transverse holes through said tongues are provided selectively aligned and are fitted with pulling pins for securement of said tongues at a selected position, said pins being secured by transverse spring pins wherein a spacer is provided at a forward end of the inside of said outer tongue, said rear end of said inner tongue having a stop for engagement with said spacer to prevent sliding dis-engagement of said tongues, wherein said inner tongue includes a toothed rack engaging a gear supported in a bearing on a lug affixed to an underside of said outer tongue including a hand crank having a transverse square shank engaging a square opening in a hub of said gear, in further combination with a tooth having a square hole receiving slidably therethrough said square shank, said tooth being engagable with a slot in said lug in one position to lock said gear against rotation.

4,169,612
SKI BINDINGS

Bernhard Kirsch, Im Litzelholz 23, 5500 Trier-Biewer, Fed. Rep. of Germany

Filed Oct. 4, 1977, Ser. No. 839,460
Claims priority, application Fed. Rep. of Germany, Oct. 7, 1976, 2645253; Feb. 14, 1977, 2706133; Apr. 14, 1977, 2716431
Int. Cl.[2] A63C *9/08*
U.S. Cl. 280—611 **34 Claims**

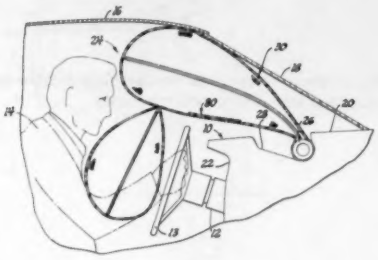


1. In a ski binding including a toe clamp for securing a ski boot to a ski, such toe clamp being separable from the ski, the improvement comprising means mounting the toe clamp on the ski for separation of the toe clamp both from the ski and the ski boot automatically in response to a forward force in excess of a predetermined force being exerted on the toe clamp by the ski boot.

4,169,613
OCCUPANT RESTRAINT CUSHION

Ronald R. Barnett, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 6, 1978, Ser. No. 883,895
Int. Cl.[2] B60R *21/08*
U.S. Cl. 280—732 **4 Claims**



1. In combination with a vehicle body having an instrument panel provided with a cavity in the upper portion thereof having a steering wheel supported for controlled movement by a vehicle operator, an occupant restraint cushion adapted to be housed in said cavity in the instrument panel and to be deployed rearwardly relative thereto when inflated, said occupant restraint cushion comprising a top wall and a bottom wall defining an upper compartment having a front end adapted to be attached to said instrument panel and a rear end adapted to be located above and to the rear of the steering wheel when inflated, the bottom wall being divided into a front section and a rear section, a front wall depending from said front section and a rear wall depending from said rear section, said front and rear walls defining a lower compartment adapted to be positioned between the vehicle operator and the steering wheel when inflated, and means directly joining the front wall to the rear wall adjacent said upper compartment so as to locate the lower compartment intermediate the front and rear ends of the upper compartment and provide at least one orifice of a predetermined size for connecting the upper compartment with the lower compartment to thereby control gas flow therebetween and cause the upper compartment to be substantially inflated prior to inflation of the lower compartment.

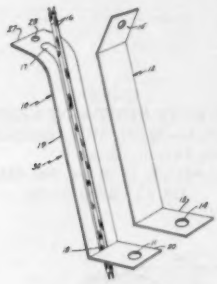
4,169,614
SEAT BELT ASSEMBLY

Gordon A. Eliens, Grand Rapids, Mich., assignor to U.S. Industries Inc., Grand Rapids, Mich.

Filed Oct. 19, 1976, Ser. No. 733,952
Int. Cl.[2] B60R *21/10*
U.S. Cl. 280—801 **9 Claims**

1. A seat belt assembly comprising:
an elongated metal strap adapted to be coupled to a seat belt fastener at a first extremity and adapted to be coupled to a vehicle at a second extremity;
electrical conductor means lying adjacent and extending along the length of said strap; and

said strap and conductor means being molded in place in a plastic material which directly contacts and encapsulates



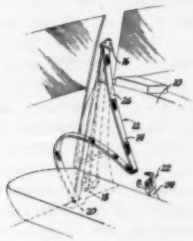
said conductor means and which defines a cover encapsulating said strap and conductor means.

4,169,615

SEAT BELT SECURING DEVICE

Gary A. Wize, Washington, and Louis P. Garvey, West Bloomfield, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 2, 1977, Ser. No. 847,837
Int. Cl.[2] B60R *21/10*
U.S. Cl. 280—801 **3 Claims**



1. In a seat belt system having a loop of restraint belt, a securing device for releasably securing the belt in restraining position about the occupant, said securing device comprising:

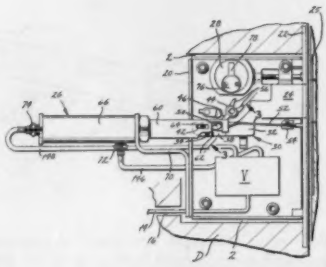
a housing, first and second tong arms having curved arm portions extending outwardly of the housing and defining a space therebetween for encirclement of the belt, first and second pivot means provided on the housing and respectively pivotally mounting the tong arms for movement between an open spaced-apart belt-releasing position and a closed belt capturing position encircling the belt, a plurality of interengaged gear teeth provided on the first and second tong arms to coordinate movement of the first and second tong arm in both the opening and closing directions through the entire range of pivotal movement between the open and closed positions, an actuating member movably mounted on the housing and cooperably associated with only one of the tong arms so that movement of the actuating member relative the housing pivots the one tong arm to the closed position and the interengaged gear teeth pivot the other tong arm to the closed position.

4,169,616

VALVE AND CYLINDER-ACTUATED LOCK CONTROLLED THEREBY

Francis C. Peterson, St. Louis County, Mo., assignor to C. Hager & Sons Hinge Manufacturing Company, St. Louis, Mo.

Filed Sep. 26, 1977, Ser. No. 836,728
Int. Cl.[2] E05B *51/00*; F16K *11/07*
U.S. Cl. 292—144 **16 Claims**



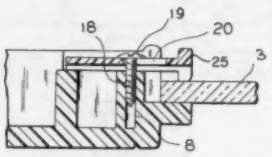
5. In combination with a double acting fluid cylinder having a port communicating with each end thereof, a valve comprising: a single inlet port connected to a source of pressurized fluid, a valve body having a cavity into which the inlet port opens and a pair of return passages opening into the cavity at the ends thereof and a pair of transfer passages opening into the cavity intermediate the ends of the cavity so that the return and transfer passages are arranged in sets, there being one return passage and one transfer passage in each set; a valve element shiftable in the cavity between end positions and in one end position directing pressurized fluid from the inlet port to the one transfer passage and in the other end position directing pressurized fluid from the inlet port to the other transfer passage; a separate back pressure valve connected with the return and transfer passages of each set and with one of the ports of the cylinder, each back pressure valve including a valve chamber into which the transfer passage and return passage for that back pressure valve opens and a blocking element in the valve chamber, the blocking element being configured to block the return passage for its back pressure valve when pressurized fluid passes through the transfer passage for its back pressure valve, whereby the pressurized fluid will flow from that transfer passage to the cylinder port that is connected to the back pressure valve, the blocking element further being configured to block the transfer passage for its back pressure valve and open the return passage for its back pressure valve when the pressure in the transfer passage drops and a back pressure develops at the cylinder port that is connected to the back pressure valve, whereby the back pressure is transmitted through the return passage to the cavity wherein it causes a force to be exerted on the valve element so that the valve element will shift therein.

10. A lock for securing a door in a door frame, said lock comprising: a case; a lock bolt in the case and being capable of shifting from a retracted position wherein it does not interfere with the frame to an extended position wherein it projects into the frame and secures the door; the combination of claim **5**; and means for coupling the cylinder with the bolt such that the bolt is extended and retracted by the cylinder.

4,169,617
RELEASABLE HOLDING MEANS FOR WINDOW OR SCREEN

Paul W. Koeneman, Royal Oak, and Peter R. Emanuel, Marine City, both of Mich., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Apr. 10, 1978, Ser. No. 894,814
Int. Cl.[2] E05C *1/02*
U.S. Cl. 292—149 4 Claims



1. Means for releasably holding a window or screen in a door frame comprising in combination

a door frame having an opening to receive a removable window or screen therein, said frame having a continuous flange around said opening adapted to support one side of said window or screen;

a plurality of recesses in said frame adjacent said opening, the base of each of said recesses containing a threaded hole therein;

a slidable tab within each said recess having an elongated slot therethrough and at least two runners extending from said tab on the underside thereof upon which to slide said tab from a retracted to an extended position within said recess, each of said runners containing a foot extending from the extremity thereof adapted to contact the window or screen when the tab is in extended position, each said tab containing a raised rim on the outerside thereof opposite said foot to facilitate sliding said tab to extended position;

threaded means passing through the elongated slot in the tab to the threaded hole in the base of each recess for releasably holding said tab in a selected fixed position in said recess;

said tabs in extended position adapted in combination to securely hold a window or screen against the flange on said frame and adapted in retracted position to release said window or screen.

4,169,618
PLASTIC DOOR LOCK

Dennis G. Potter; Hagen Dietrich, both of Delta, and Joseph Potschka, Vancouver, all of Canada, assignors to Norris Industries, South Gate, Calif.

Continuation of Ser. No. 712,898, Aug. 9, 1976, abandoned. This application Nov. 21, 1977, Ser. No. 853,201
Int. Cl.[2] E05C *1/12*; E05B *3/08*
U.S. Cl. 292—169.15 20 Claims

1. A lock for a door which has an opening between outside and inside faces and a bore extending from a side edge transversely into said opening,

said lock comprising for the outside end of said opening an outside rose member with an outside knob member having a rotatable retention mounting on said outside rose member,

an inside rose member for the inside end of said opening with an inside knob member having a rotatable retention mounting on said inside rose member, said knob members having a common axis of rotation between latched position and unlatched position

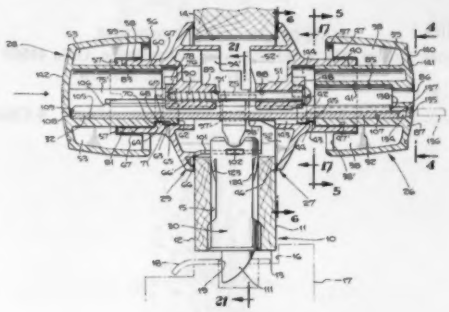
a single piece spindle interconnecting said knob members,

a latch bolt subassembly in said bore including a case and a latch bolt, said latch bolt subassembly including a shaft and bolt head reciprocatably mounted in said case, the long axis of the latch bolt subassembly being in transverse alignment with the axis of rotation of said knob members,

attachment means adapted to fasten said rose members together on the door,

complementary engageable elements on the respective rose members for preventing relative rotation between said rose members,

said spindle having opposite ends in non-rotatable engagement with the respective knob members and a retract shoulder of said knob members on the side of said axis of rotation adjacent said latch bolt head, said spindle having the longitudinal axis thereof normally in transverse alignment with the long axis of the latch bolt subassembly, said



long axis of the latch bolt subassembly having a location extending through said spindle and the axis of rotation of said spindle, a lateral clearance in each rose member through which said spindle extends to allow for rotation of the spindle,

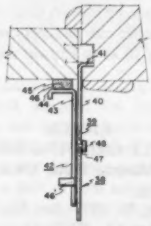
rollback means on the inside end of the latch bolt shaft comprising a yieldable arm adjacent said spindle, said arm having a fixed end on the latch bolt shaft and a free end,

and a rollback shoulder on the free end of said arm facing the retract shoulder of said spindle and on the side of said axis of rotation adjacent said latch bolt head, said rollback shoulder being adapted to be shifted inwardly with the latch bolt pass said axis of rotation upon rotation of said spindle by operation of either of said knob members.

4,169,619
PORTABLE SECURITY LOCK

James H. McCracken, 1486 Moore Cir., Corona, Calif. 91720

Continuation of Ser. No. 801,208, May 27, 1977, abandoned. This application Jun. 19, 1978, Ser. No. 916,487
Int. Cl.[2] E05C *19/18*
U.S. Cl. 292—290 4 Claims



1. A portable security lock for doors, their latches and latch sockets, including, in combination: first and second individually unitary elongate members mutually disposed in slidable engagement, said elongate members having oppositely and laterally extending forward foot portions, one of said foot portions having adhered thereto a fixed, forwardly facing,

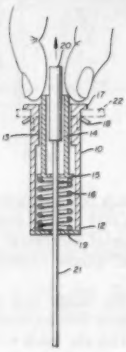
resilient abutment pad means for rearwardly biasing said one foot portion and its elongate member when said pad means engages an external, closed door, one of said elongate members being provided with an elongate slot having a series of detent notches, the remaining elongate member having a laterally extending dog slideably disposed in said slot and constructed to be releasably disposed in and, by virtue of said resilient paid means, resiliently pressed against a side of a respective one of said notches, that elongate member provided said resilient pad means having an integral lateral finger tab, and means for securing said elongate members together.

4,169,620

CAR DOOR LOCK CONTROL

Nick Pacura, 921 Wilkinson Ave., Youngstown, Ohio 44509

Filed Nov. 9, 1977, Ser. No. 849,870
Int. Cl.[2] E05C *13/00*
U.S. Cl. 292—347 **4 Claims**



1. A car door lock control for a car door lock mechanism having an actuator rod and a button attached thereto movably positioned in an opening in the car door, said car door lock control comprising a housing vertically positioned in said opening, said housing having an area of reduced diameter extending inwardly of its upper end, a sleeve of a length substantially double that of the area of reduced diameter in said housing freely slidably disposed in said housing and extending outwardly therefrom, and outturned annular flange on the lower end of said sleeve for engaging the portion of said housing defining the area of reduced diameter so as to limit outward movement of said sleeve relative thereto, a spring in said housing normally urging said sleeve outwardly of the housing whereby the actuator rod and button when positioned outwardly of said sleeve can be moved to a locked position within said sleeve and said sleeve can be freely moved into said housing against said spring so as to expose said button.

4,169,621

BOTTLE GRIPPING DEVICE

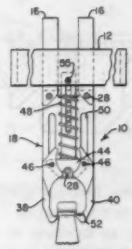
Robert W. McGill, Munroe Falls, Ohio, assignor to A-T-O, Inc., Willoughby, Ohio

Filed Oct. 25, 1977, Ser. No. 845,460
Int. Cl.[2] B25B *11/00*
U.S. Cl. 294—116 **9 Claims**

1. In an article gripping device, the combination of a frame including a pair of opposed, spaced side plates, each side plate having a lower upwardly and outwardly inclined cam surface and an upper inwardly and upwardly inclined cam surface connecting to the upper end of said lower surface,

a gripper jaw carrier member slidably positioned on said frame between said side plates for movement on a vertical axis relative to said frame,

a pair of gripper jaws pivotally carried by said jaw carrier member at a lower end thereof and positioned in opposed relation between and protruding downwardly from said side plates, cam follower surfaces being formed on upper portions of said gripper jaws and engaging said cam surfaces, said cam follower surfaces comprising a pair of vertically spaced surfaces on each gripper jaw with the



two cam follower surfaces of each gripper jaw normally concurrently engaging each of said two cam surfaces to control, positively, the positions of said gripper jaws as changed by the relative vertical position of said jaw carrier member on said frame, and

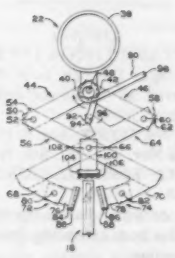
a spring urging the jaw carrier member to gripper jaw article engaging position, said cam follower surfaces engaging said cam surfaces at all times to control the position of said gripper jaws.

4,169,622

TONG FOR SUPPORTING GLASS SHEETS HAVING THEIR EDGES WELDED TOGETHER

George R. Claassen, New Kensington, and Raymond J. Mickelic, Springdale, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 15, 1977, Ser. No. 860,925
Int. Cl.[2] B66C *1/48*
U.S. Cl. 294—118 **15 Claims**



1. In a tong for supporting a heated sheet wherein the tong is of the type having a pair of sheet engaging members and means mounting said members for moving said members toward each other into a first position to engage the sheet and away from each other toward a second position to disengage the sheet, the improvement comprising:

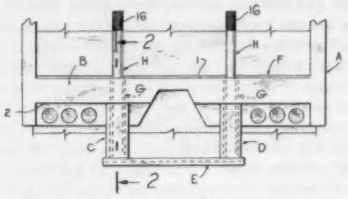
the sheet engaging members comprising a metal pad made of pressed metal wires or strands having a continuous network of passageways having fluid therein to minimize thermal shock to the heated sheet when the sheet engaging members are in the first position.

4,169,623

HAND RAILS EXTENSIBLY MOUNTED IN GUIDE TUBES AT THE REAR OF A VAN OR TRAILER

James B. Smith, 1193 Arch Ct., Concord, Calif. 94520

Filed Jan. 3, 1978, Ser. No. 866,489
Int. Cl.[2] B62D *39/00*
U.S. Cl. 296—1 C 2 Claims



1. A vehicle having a body with a flat horizontal upper surface and an unobstructed open rear end;

(a) a laterally extending horizontal member positioned at the rear end of said body whose upper surface lies in the same plane as the upper surface of the vehicle body;

(b) vertical guide tubes depending from said horizontal member and spaced laterally from each other and having their tops lying flush with the upper surfaces of said member and the flat surface of said body;

(c) vertical hand rails slidably mounted in said guide tubes and having their tops lying flush with the tops of said guide tubes when said hand rails are in retracted position so as to offer no obstruction to the rear, open end of the body, said hand rails being movable into operative position to have the greater portions of their lengths extending above the upper surface of the body; and

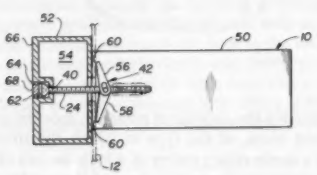
(d) means for securing said hand rails in extended position.

4,169,624

FRONT MOUNTING VEHICLE RADIO

Howard Yefsky, South Hackensack, N.J., and Aaron Hirsh, Deer Park, N.Y., assignors to Howard Yefsky, Glenview, Ill.

Filed Jun. 16, 1978, Ser. No. 916,195
Int. Cl.[2] B60R *11/02*
U.S. Cl. 296—37.12 3 Claims



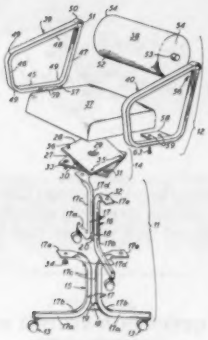
1. For a vehicle having a dashboard bounding an opening for mounting a radio in an accessible position for being operated from within said vehicle, an improved radio adapted to be mounted in said dashboard mounting opening from said radio-operating location within said vehicle, said radio comprising wall means bounding two separate compartments operatively arranged in T-shaped relation to each other for housing the operating components of said radio, at least two spaced apart radio-mounting bolts extending rearwardly from one said compartment in parallel relation on opposite sides of the other said compartment for completing an attachment of said housing to said dashboard while said other compartment between said bolts has an operative position projected rearwardly through said dashboard mounting opening, said radio-mounting bolts having gripping heads thereon operatively located internally within indentations formed in the front wall of said one compartment for receiving in seated relation each said bolt head, and plugs frictionally disposed in said indentations in covering relationship over said bolt heads, whereby access to said mounting bolt heads incident to any unauthorized tampering therewith is effectively minimized.

4,169,625

KNOCK-DOWN PEDESTAL CHAIR

Warren D. Petersen, St. Charles, Ill., assignor to Burd, Inc., Howell Division, St. Charles, Ill.

Filed Apr. 5, 1978, Ser. No. 893,807
Int. Cl.[2] A47C *1/02*
U.S. Cl. 297—349 17 Claims



1. A pedestal base swivel chair formed of flat planar components which comprises an upholstered back unit with dowel ends projecting therefrom, a seat unit, a pair of arm frames with flanges for underlying the sides of the seat unit and sockets for receiving the dowel ends, a pair of leg units each having two planar diametrically opposed legs connected by plates with interfitting slots, a swivel unit having a bottom plate for overlying the leg units and a top plate for underlying the seat unit, said leg units being held in right angle relation by said interfitting slots, nut and bolt assemblies locking the leg units to said bottom plate of the swivel unit, said seat unit having a base board with bolt holes overlying the top plate of the swivel unit and the flanges of the arm frames, nuts secured to said base board over the mouths of said bolt holes, bolts threaded in said nuts securing the top plate of said swivel unit and said flanges to said base board, wood screws extending through said sockets threaded into said dowel ends securing the back unit to the arm frames, and a swivel caster depending from each leg of the leg units.

4,169,626

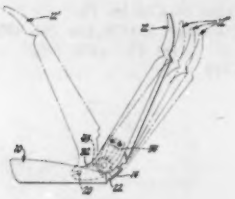
RECLINING VEHICLE SEAT

Arthur W. Hollar, Jr., Grosse Pointe, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 17, 1978, Ser. No. 925,215
Int. Cl.[2] A47C *1/026*
U.S. Cl. 297—365 3 Claims

1. In a seat for a vehicle body and of the type including a seat bottom and a seat back adapted for folding and unfolding rotation relative to the seat bottom from and to a seat-forming position therewith and also for selected reclining adjustment within a range of such seat-forming positions, recliner hinge structure comprising, a pair of first hinge parts one at either side of the seat bottom and a pair of second hinge parts each fixed to one side of said seat back, means mounting said first hinge parts on the vehicle body about a first axis and adapting said folding and unfolding rotation of the seat back to occur thereabout, means hingedly interconnecting each said first hinge part with a respective second hinge part for said reclining adjustment of the seat back about a second axis spaced from said first axis, means including biasing means and releasable means operative to hold any selected seat-forming position of

said seat back against bias in one direction about said second axis or occupant pressure in the opposite direction until released by manual actuation, and means responsive to forward folding rotation of said seat back about said first axis from the



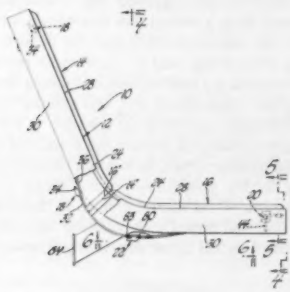
seat-forming position thereof to prevent selected adjustment of the seat-forming position about said second axis by release of the holding means and until said seat back is restored to seat-forming position.

4,169,627

FRAME RETENTION SYSTEM FOR SEAT COMPONENTS

Randall T. Murphy, and Thomas H. Keane, both of Morristown, Tenn., assignors to Lear Siegler, Inc., Troy, Mich.

Filed Jul. 31, 1978, Ser. No. 929,158
Int. Cl.[2] A47C *7/02*
U.S. Cl. 297—452 **20 Claims**



1. In a seat including a frame component and a seat component supported by the frame component, a retention system comprising: a retainer including a member of a unitary construction made from wire and having an intermediate bight section secured to one of the components; the retainer member including a pair of deflectable latch legs extending in opposite directions from the bight section; and the other component including a pair of keepers that are respectively engaged by the latch legs upon deflection thereof so as to secure the seat component to the frame component.

4,169,628

PANEL FOR A SEAT

Emanuel Wolf, Thalwil, and Alfred Weber, Schaffhausen, both of Switzerland, assignors to Swiss Aluminium Ltd., Chippis, Switzerland

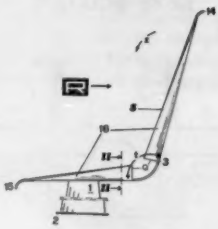
Filed Aug. 30, 1978, Ser. No. 937,931
Int. Cl.[2] A47C *7/02*
U.S. Cl. 297—454 **12 Claims**

1. An improved seat comprising:

a seat portion having a seating surface;

a back portion having a back support surface, said back support surface being disposed from said seating surface about an axis so as to form therewith an obtuse angle;

wherein said seat portion and said back portion are formed of a single unitary composite structure comprising a core



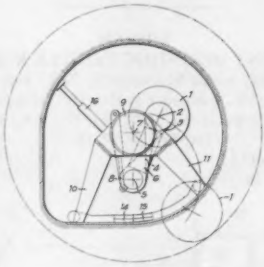
layer of high polymer organic material having a first surface corresponding to said seating surface and said back support surface and a second surface substantially parallel to said first surface, and at least one metal sheet layer bonded to one of said first and second surfaces.

4,169,629

TUNNELING MACHINE WITH PLURAL ADJUSTABLE ARMS CARRYING SINGLE CUTTER

Marie G. J. Legrand, Koolmijnlaan 348, 3540 Zolder, Belgium

Filed Mar. 14, 1978, Ser. No. 886,534
Claims priority, application Belgium, Mar. 30, 1977, 255779; Nov. 3, 1977, 256390
Int. Cl.[2] E21C *9/10*
U.S. Cl. 299—61 **14 Claims**



1. Machine for the digging of passages, galeries or tunnels in underground work, of the type in which the stoping device consists of a single rotary cutter of which the axis of rotation is generally perpendicular to the plane of the working-face, said rotary cutter being mounted on a first arm which pivots around an axis which is also generally perpendicular to the working-face, said first arm being journalled about said axis on a second arm, which in turn is attached on a shaft which is generally perpendicular to the working-face and bears in the machine frame, the length of the two arms and the angles of rotation of the arms being selected so that the mill can cover the entire surface of the working-face to be stoped, without having to move the machine laterally.

4,169,630

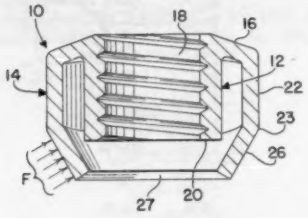
SHEET METAL NUT

David P. Wagner, Geneva, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Mar. 2, 1978, Ser. No. 882,695
Int. Cl.[2] B60B *3/16*; F16B *37/14*
U.S. Cl. 301—9 DN **9 Claims**

1. A one-piece sheet metal nut member for clampingly secur-

ing a thermoplastic workpiece to a primary workpiece, wherein the properties of the thermoplastic workpiece are such that it exhibits cold flow under load, said nut comprising a tubular, radially inner body portion extending downwardly a first predetermined axial distance from an upper wall surface, the inner periphery of said inner body portion having a first predetermined inner diameter and including a plurality of thread convolutions in a central through bore; a generally tubular, radially outer body portion surrounding said inner body portion and extending downwardly a second predetermined axial distance from the upper wall surface, the second axial distance being greater than the first axial distance so that the lowermost extremity of the outer body is spaced downwardly from the lowermost extremity of the inner body; the upper wall surface integrally connecting the uppermost extremities of the inner and outer body portions; the outer body portion comprising an upper and a lower section, the lower section being a downwardly and inwardly tapered frustoconical load bearing surface terminating at a circular aperture having a center substantially on the longitudinal axis of the



tubular, threaded inner body portion; the diameter of said aperture being a second predetermined diameter greater than said first diameter of the threaded inner body portion, the upper section being generally concentric with the inner body portion and including torque accepting surfaces on its outer periphery, the upper section of the outer body and the upper wall surface incorporating axially compressible spring means for permitting the inner body to move axially relative to the outer body without disturbing the broad surface contact between the frustoconical lower outer body section and a bearing surface of the thermoplastic workpiece; wherein the frustoconical load bearing surface of said nut is adapted to matingly engage a frustoconical recess surrounding a through bore in the thermoplastic workpiece so that the nut, with an associated threaded stud extending through the bore in the thermoplastic workpiece, can compressingly clamp said thermoplastic workpiece and distribute the clamping force over the workpiece in a manner which minimizes the cold flow effect in the clamped joint and remain in clamping engagement inspite of said cold flow.

4,169,631

SPROCKET-TYPE LOOP CARRIER

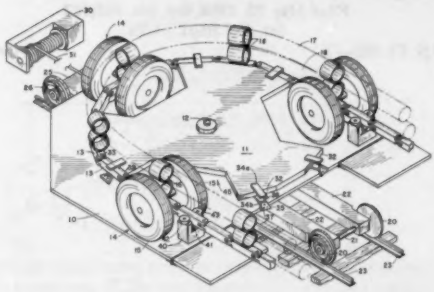
David L. McCain, Ponca City, Okla., and Ronald W. Umphrey, Fairmont, W. Va., assignors to Continental Oil Company, Ponca City, Okla.

Filed Nov. 25, 1977, Ser. No. 854,936
Int. Cl.[2] B65G *53/30*
U.S. Cl. 406—40 **5 Claims**

1. A conveyor apparatus for moving a slurry line which is movably supported by a plurality of wheeled carts, through a 180° bend, and wherein each of said carts is connected by one or more interconnecting linkages attached between said carts, said conveyor including a support frame, means for moving said support frame over the surface of the earth, and a disc, rotatably attached at its axis to said frame, our improvement comprising:

(a) a plurality of spaced notch means formed in the periphery of said disc each notch means of a size to receive a portion of said wheeled cart extending from said linkages towards said axis; and

(b) a plurality of upper and lower linkage engaging means each attached to the periphery, each having a linkage engaging surface, and spaced to engage each of said inter-



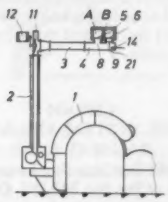
connecting linkages and retain said linkages against said periphery while said wheeled carts and linkages are passing through said 180° bend, with a bearing means mounted in the linkage engaging surface of said lower linkage engaging means.

4,169,632

PNEUMATIC SYSTEM FOR FEEDING A PLURALITY OF CARDS WITH OPEN FIBER FLOCKS

Werner Lattmann, and Rudolf Wildbolz, both of Winterthur, Switzerland, assignors to Rieter Machine Works, Limited, Winterthur, Switzerland

Filed Aug. 19, 1977, Ser. No. 826,234
Claims priority, application Switzerland, Aug. 24, 1976, 10699/76
Int. Cl.[2] B65G *53/06, 53/50*
U.S. Cl. 406—93 **13 Claims**



1. A pneumatic system for feeding a plurality of cards with pneumatically transportable fiber flocks, said system comprising

a plurality of feed ducts for pneumatically transporting flock along said ducts;

a branch duct for each card having selectively openable connections to each of said feed ducts to receive a flow of flock therefrom,

means in communication with each respective branch duct for causing a flow of air along said branch duct from said connections towards said cards;

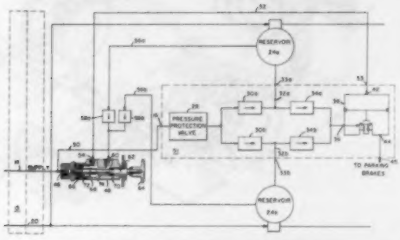
an air intake in each said branch duct upstream of said connections; and

a flock feed chute for each card, each feed chute being connected to a respective branch duct downstream of said connections and to a respective card to deliver flock to said respective card.

4,169,633
MULTI-FUNCTION PARKING BRAKE CONTROL VALVE WITH SEPARATED SUPPLY AND CONTROL INPUTS

George Stearns, Florissant, Mo., assignor to Wagner Electric Corporation, St. Louis, Mo.

Filed May 15, 1978, Ser. No. 905,962
Int. Cl.[2] B60T *13/28*
U.S. Cl. 303—7 15 Claims



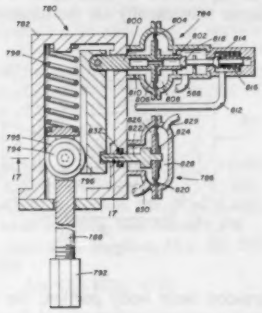
1. A brake control system for a towed vehicle comprising:
(a) supply pressure means for connecting supply pressure to said towed vehicle;
(b) valve portion means for supplying said supply pressure to two pressure reservoirs and control means in said valve portion means responsive to said supply pressure for controlling the application of pressure stored in said two reservoirs to a parking brake outlet;
(c) manual valve means having first and second selectable conditions and first, second and third connections;
(d) said supply pressure means being connected to said first connection;
(e) pressure selection means connected to said two pressure reservoirs for selecting pressure from the pressure reservoir having the higher air pressure and securing said pressure from passing to the other pressure reservoir;
(f) said selected pressure being connected to said second connection;
(g) said third connection being connected to a control inlet in said control means; and
(h) said manual valve means being operative in its first condition to interconnect said first and third connections and to block its second connection and in its second condition to interconnect said second and third connections and block said first connection.

4,169,634
BRAKE CONTROL SYSTEM AND APPARATUS FOR RAILWAY CARS

William R. King, 1909 Sunshine Sq., Longview, Tex. 75601

Continuation-in-part of Ser. No. 843,285, Oct. 18, 1977, Pat. No. 4,123,115, which is a continuation-in-part of Ser. No. 775,379, Mar. 7, 1977, Pat. No. 4,143,923. This application Feb. 15, 1978, Ser. No. 877,998
The portion of the term of this patent subsequent to Oct. 31, 1995, has been disclaimed.
Int. Cl.[2] B60T *8/18*
U.S. Cl. 303—22 R 27 Claims

1. A brake control system, interposed between a pressurized brake pressure supply line including a train brake valve and a pressurized brake cylinder line leading to the brakes of a railway car having sprung and unsprung portions, for transmitting to the brakes a predetermined pressure drop signal responsive to a pressure drop effected by the brake valve in the brake pressure supply line, which comprises:
structure defining a supply chamber with a port connected to the brake pressure supply line;
structure defining a control chamber with a port connected to the brake cylinder line;
first check valve means disposed between the brake pressure supply line and the brake cylinder line for permitting fluid communication between the supply and control chambers responsive to a pressure rise signal in the brake pressure supply line until the pressures in said chambers equalize to effect brake release;
diaphragm means movably abutting said supply and control chambers with respective surfaces of different areas;
first valve means mounted on the diaphragm means and responsive to predetermined positioning thereof for permitting fluid flow through the diaphragm means between the supply and control chambers responsive to a pressure drop effected in the brake pressure supply line by the brake valve until the diaphragm means regains equilibrium;
means for applying a predetermined bias to the diaphragm means urging the first valve means closed;
structure defining a fluid bias chamber having a port and abutted in part by the movable diaphragm means; and



strut cylinder means connected to the port of the fluid bias chamber and having a strut responsive to the relative positioning of the sprung and unsprung portions of the railway car for applying a predetermined fluid bias to the diaphragm means urging the first valve means open when the railway car is loaded so that the pressure drop in the brake cylinder line of a fully loaded railway car is substantially equal to the pressure drop effected by the brake valve in the brake pressure supply line, and so that the pressure drop in the brake cylinder line of an empty railway car is relatively smaller than the pressure drop effected by the brake valve in the brake pressure supply line by the inverse ratio of the diaphragm means surface areas abutting the control and supply chambers, respectively, and so that the pressure drop in the brake cylinder line of a partially loaded railway car is a predetermined pressure drop proportional to the loading of the railway car for all pressure drops effected in the brake pressure supply line by the brake valve.

4,169,635
FIFTH WHEEL BEARING PLATE COVER

Frank Szalay, and Joseph C. Kubik, both of Youngstown, Ohio, assignors to Eastern Tool & Machine, Inc., Youngstown, Ohio

Filed Feb. 17, 1978, Ser. No. 878,898
Int. Cl.[2] F16C *17/04*
U.S. Cl. 308—136 9 Claims

1. In combination with a fifth wheel of a vehicle having a substantially flat semi-circular bearing plate with a pair of spaced parallel outwardly extending sloping guides on one side thereof forming a substantially V-shaped passage between the guides extending into the flat bearing plate; a bearing plate cover comprising a section of sheet plastic material having a low friction coefficient and formed in a shape conforming to and covering all of the bearing plate and the sloping guides, a metal member attached coextensively to the underside of said bearing plate cover along one edge thereof for adding rigidity

thereto, said metal member extending inwardly from the edge of said bearing plate cover and means for securing the bearing

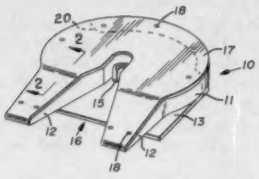


plate cover and said metal member to the bearing plate and guides.

4,169,636

BALL BEARING RETAINER

Robert E. Hooper, Huron, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 713,443, Aug. 11, 1976, abandoned. This application Jul. 20, 1977, Ser. No. 817,206

Int. Cl.² F16C *19/20*

U.S. Cl. 308—201 **8 Claims**

1. A ball bearing retainer comprising:

a unitary molded plastic structure having an end ring concentric to an axis, a plurality of axial fingers extending from said end ring in cantilever fashion which fingers in cooperation with said end ring form a like number of open ended ball pockets of a given diameter and projection means at the free end of each of said fingers for retaining balls in said ball pockets,

said projection means comprising a radially outer section which extends axially and circumferentially in one direction to reduce the opening for the ball pocket to one side of its associated finger and a radially inner section which extends axially and circumferentially in an opposite direction to reduce the opening for the ball pocket to the opposite side of its associated finger, said radially inner section being radially spaced from and located exclusively radially inwardly of said radially outer section.

4,169,637

DRILL BUSHINGS, PUMP SEALS AND SIMILAR ARTICLES

Edward J. Voitas, Mahwah, N.J., assignor to Eastern Fusecoat Incorporated, Hawthorne, N.J.

Continuation-in-part of Ser. No. 603,242, Aug. 8, 1975, Pat. No. 4,087,137. This application Jan. 24, 1978, Ser. No. 871,844

The portion of the term of this patent subsequent to May 2, 1995, has been disclaimed.

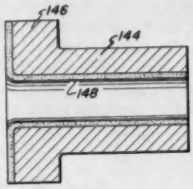
Int. Cl.² F16C *33/04*

U.S. Cl. 308—241 **5 Claims**

1. An article of manufacture for accurately locating abutting relatively moving surfaces, one of which surfaces is on the article of manufacture and the other of which surfaces is on an abutting element, said article comprising:

a body formed of a relatively rigid material, such as steel, and having a recess therein;

a liner of particles having a hardness of 84–93 Rockwell C in a matrix of material having a hardness of about 59–67 Rockwell C bonded to at least a portion of said recess in the body and having said one of the surfaces thereon to receive the abutting moving surface of the abutting element;



the liner being such that the liner and the body together have a coefficient of thermal expansion substantially equal to that of the abutting element to thereby accurately maintain the abutting location of the moving surfaces.

4,169,638

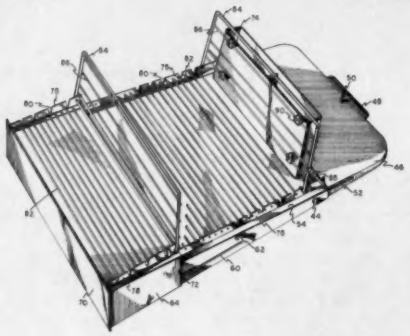
DRAINBOARD—EXTEND-A-DRAIN

Edward J. Cirasuolo, West Haven, Conn., and Rocco Cirasuolo, St. Petersburg, Fla., assignors to New Ideas, Inc., Hamden, Conn.

Filed May 11, 1978, Ser. No. 904,878

Int. Cl.² A47B *77/06*

U.S. Cl. 312—229 **15 Claims**



1. A drainboard comprising:

an elongated hollow rear member having front and rear ends, its front end being open, the rear member having a top surface which extends inclinedly downward from its rear end to its front end;

an elongated hollow middle member having front and rear ends, its front end being open, the middle member having a top surface which extends inclinedly downward from its rear end to its front end, the maximum height of the top surface of the middle member being less than the minimum height of the top surface of the rear member;

first means cooperating with the rear and middle members to establish a slidable interconnection therebetween, said first means having an extended position at which the rear end of the middle member is disposed adjacent but in front of the front end of the rear member, said first means having a withdrawn position at which the rear end and at least a substantial adjacent portion of the middle member is disposed within the front end and a substantial adjacent portion of the rear member;

an elongated front member having front and rear ends, the front member having a top surface which extends inclinedly downward from its rear end to its front end, the

maximum height of the top surface of the front member being less than the minimum height of the top surface of the middle member; and

second means cooperating with middle and front members to establish a slidable interconnection therebetween, said second means having an extended position at which the rear end of the front member is disposed adjacent but in front of the front end of the middle member, said second means having a withdrawn position at which the rear end and at least a substantial portion of the front member is disposed within the front end and a substantial adjacent portion of the middle member.

4,169,639

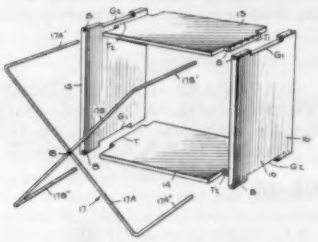
KNOCK-DOWN FURNITURE MODULE

Colman Zola, 58 Tamarack Way, Pleasantville, N.Y. 10570

Filed Sep. 1, 1978, Ser. No. 938,837

Int. Cl.[2] A47B *47/04*

U.S. Cl. 312—265 **8 Claims**



1. A knock-down module for creating articles of furniture, the module comprising:

A. four panels which define the upper, lower and side walls of the module, the edges at opposite ends of each panel having longitudinal bores therein, the edges of the top and bottom panels being cut to define intermediate tongues and the edges of the side panels being cut to define complementary grooves, whereby the panels may be assembled in edge-to-edge relation to create an open box-like structure having rectangular front and rear openings; and

B. a strut connector which combines with the panels to create a trussed structure, said connector being formed of a pair of intersecting arms, each arm bridging a set of diagonal corners in the rear opening and having pins extending laterally therefrom which are insertable in said bores to hold the jointed corners together.

4,169,640

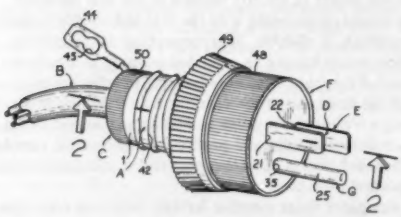
ELECTRIC PLUG WITH NOVEL MEANS CONNECTING WIRES TO TERMINALS

Hop Lee, 2455 - 24th Ave., San Francisco, Calif. 94116

Filed Apr. 13, 1978, Ser. No. 895,749

Int. Cl.[2] H01R *3/06*

U.S. Cl. 339—14 P **1 Claim**



1. An electric plug comprising:

(a) a terminal carrier having an axial bore for receiving a cable carrying three wires;

(b) electrodes secured to said terminal carrier, each electrode having an integral base with a hook-shaped projection around which the bare metal strands of the wires are wrapped for electrically connecting the wires to their associate electrodes;

(c) said terminal carrier having longitudinally extending grooves in its outer periphery and disposed adjacent to the hook-shaped projections for receiving the ends of the bare metal wire strands that extend beyond the wrapped wire portions;

(d) an end cap having a cylindrical skirt for receiving the adjacent end of said terminal carrier, said cap having openings in its closed end through which said electrodes project, the inner surface of said closed end having recesses for receiving the outer ends of said hook-shaped projections and the surfaces adjacent to the recesses contacting the bare wire strands and pressing them into electrical contact with the electrode bases;

(e) the cylindrical skirt of said end cap enclosing the grooves in the terminal carrier for retaining the bare wire strands therein; and

(f) a coupling connector rotatably mounted on a reduced cylindrical portion of said terminal carrier, said coupling connector having a portion bearing against a shoulder on the terminal carrier and having a threaded connection with the threads on the end cap so that when said coupling is rotated in one direction it will force the terminal carrier into the end cap and cause the hook-shaped portions to enter the end cap recesses and the end cap surfaces disposed adjacent to the recesses to force the bare wire strands into an electrical contact with bases on the electrodes, this arrangement being the only means for providing a continuous clamping pressure of the bare wire strands on the electrode bases.

4,169,641

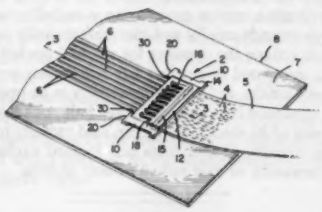
CONNECTOR CLIP FOR FLAT CABLE

Billy E. Olsson, Cumberland County, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 22, 1978, Ser. No. 918,138

Int. Cl.[2] H05K *1/12*

U.S. Cl. 339—17 F **2 Claims**



1. A one-piece stamped and formed connector clip which is mounted on a panel-like member for connecting the side-by-side parallel cable conductors of a flat cable to side-by-side parallel panel conductors on said panel-like member, said connector clip comprising:

a pair of parallel spaced-apart support strips and a clip bar integral with, and extending between, said support strips, said support strips being disposed in a plane which is offset from the plane of said clip bar,

said support strips being against said panel-like member and in straddling relationship to said panel conductors with said clip bar spaced from, and extending transversely of, said panel conductors, mechanical fastening means on said support strips and said panel-like member serving to secure said support strips to said panel-like member rigidly and permanently,

said clip bar having one side edge which extends between

said support strips, a plurality of spaced-apart cantilever springs extending from said one side edge of said clip bar obliquely towards said panel-like member, each of said springs being in alignment with, and resiliently preloaded against, one of said panel conductors, and cantilever springs being between said support strips, and

a cable stop ear on each of said support strips, said cable stop ears extending inwardly of said clip and being located beyond the free ends of said cantilever springs whereby, upon inserting said cable beneath said clip bar and moving said cable towards and past the free ends of said cantilever springs until the end of said cable is against said stop ears, said cable conductors will be held against said panel conductors by said cantilever springs.

4,169,642

INTEGRATED CIRCUIT CONNECTOR

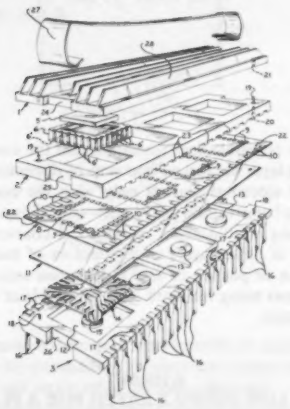
Bob Mouissie, Berlicum, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 15, 1977, Ser. No. 833,576

Claims priority, application Netherlands, Sep. 16, 1976, 7610306

Int. Cl.[2] H05K *1/12*

U.S. Cl. 339—17 F **4 Claims**



1. In a connector for an integrated circuit having a flexible printed circuit provided with at least one contact for said integrated circuit and with corresponding edge contact strips for electrical connection of said integrated circuit to external pads, and resilient means for maintaining contact pressure between the contacts and the integrated circuit, the improvement wherein:

the connector comprises (a) an upper plate, (b) an electrically insulating connecting plate provided with at least one receiving hole, each hole receiving an integrated circuit, (c) an electrically insulating lower plate, provided at its upper side with at least one receiving recess for said resilient means situated in line with a receiving hole in the connecting plate, and provided at two opposite sides with external pads at the upper side of the lower plate, said flexible circuit being flat and positioned between the connecting plate and the lower plate, said contacts for said integrated circuit being situated in line with a receiving hole in the connecting plate, said edge contact strips being situated in line with said pads, there being an insulation strip covering the flexible circuit at its under side within the edge contact strips, and said resilient means being provided in each of the receiving holes in the lower plate, each resilient means having a number of separate resilient elements each of which is in line with a corresponding contact.

4,169,643

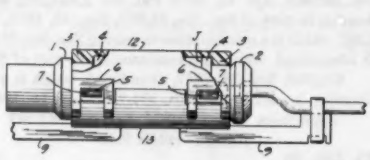
ELECTRICAL CONNECTOR MATING CLIP

David A. Gallagher, Romeoville, Ill., assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Continuation of Ser. No. 710,762, Jul. 30, 1976, abandoned. This application Aug. 10, 1977, Ser. No. 823,389

Int. Cl.[2] H01R *13/54*

U.S. Cl. 339—75 P **13 Claims**



1. A mating clip for retaining in a properly assembled and mated relation connector members having at least one pair of mated contact members disposed along a longitudinal axis and surrounding housing portions with outer retention surfaces spaced along said axis, comprising:

an axially extending body having open and closed states and extending in a closed state over an outer portion of each connector member for supporting said members,

said body including angled retaining shoulders of semi-rigid material for engaging said outer retention surfaces of said connector members in closing said body about said connector members to urge said connector members toward a properly mating relation.

4,169,644

ELECTRICAL CONNECTION DEVICES

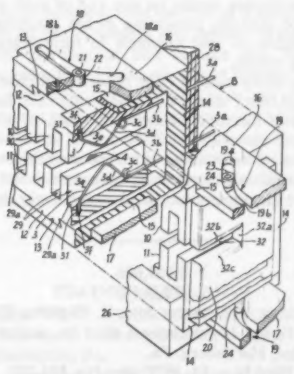
François R. Bonhomme, 6 Parc de Bearn, Saint Cloud, France

Continuation-in-part of Ser. No. 665,864, Mar. 11, 1976, abandoned. This application Oct. 26, 1977, Ser. No. 845,639

Claims priority, application France, Jul. 12, 1977, 77 21404

Int. Cl.[2] H01R *13/54*; H05K *1/12*

U.S. Cl. 339—75 MP **27 Claims**



17. A connection device adapted for use in combination with a connecting track of a printed circuit board or the like comprising a contact member having two substantially rectilinear inclined portions which intersect in a deformable active region adapted to engage a confronting surface of said connecting track and deformably engage the linear contact therewith, means for capturing one end of said contact member through a remote end of one of said portions, and means for both capturing and displacing a remote end of the other of said contact members to first effect a normal engagement between the confronting surfaces of said active region of said contact member and thereafter produce a relatively slideable movement

between the deformed active region of its opposed connecting track surface.

4,169,645

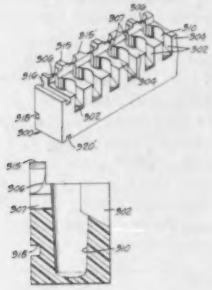
MEANS AND METHODS OF JOINING CONDUCTORS

Harry A. Faulconer, 8328 Center Dr., La Mesa, Calif. 92041

Division of Ser. No. 494,900, Aug. 5, 1974, which is a division of Ser. No. 243,600, Apr. 13, 1972, Pat. No. 3,983,312, which is a continuation-in-part of Ser. No. 74,907, Sep. 23, 1970, Pat. No. 3,668,301, which is a continuation-in-part of Ser. No. 316, Jan. 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 676,002, Sep. 28, 1967, abandoned, which is a continuation-in-part of Ser. No. 594,785, Nov. 16, 1966. This application Nov. 18, 1977, Ser. No. 852,781

Int. Cl.[2] H01R *9/08*

U.S. Cl. 339—98 **3 Claims**



1. An electrical connector member comprising:

a generally elongated body member of insulative material;

a plurality of wire-receiving channels extending across one surface of said body member;

an upstanding divider wall separating each said channel from each adjacent channel; each said divider wall extending substantially across said one surface of said body member;

laterally projecting means on one end of each said divider wall; said laterally projecting means extending into the end portions of said channels to form releasable wire retaining means;

a relatively sharp cutting edge in each said channel; insulation penetrating means associated with each said channel;

force transfer means associated with each of said channels adapted to penetrate the insulation on at least one wire in each channel, to establish electrical connection therewith, and to sever simultaneously the terminal end portion of said wire in cooperation with said relatively sharp cutting edge.

4,169,646

INSULATED CONTACT

William J. Stape, Lewisberry; John R. Hopkins, Hershey, and Robert N. Weber, Hummelstown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 14, 1977, Ser. No. 851,232

Int. Cl.[2] H01R *13/38*

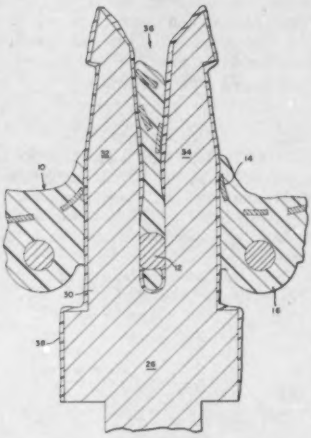
U.S. Cl. 339—99 R **8 Claims**

1. An electrical connector for terminating multi-layered cable by contacting conductors of only a single layer, said cable having a first layer of conductors in parallel spaced alignment and at least one second layer of conductors, all layers being fully encased in insulating material with no portion of the insulation or said at least one second layer being removed to effect proper termination, said connector comprising:

a plurality of electrical terminals, each having a profiled insulation piercing and conductor engaging end portion formed by a blade shaped to pierce the insulation of said cable and including a slot dimensioned to receive a respective one of said conductors of said first layer therein in tight connecting engagement, said blade being coated with dielectric material;

a housing of insulative material having said terminals mounted therein in a closely spaced condition with said end portion exposed from a mating face; and

whereby upon termination of said cable said blade shaped



portions penetrate said insulation and the conductors of said first layer are forced into slots of respective terminals to make electrical contact only with the conductors of said first layer of said cable with said dielectric material preventing establishment of electrical contact with conductors of other layers of conductors of said cable, no insulation or portion of said at least one second layer of conductors being removed from said cable at the point of termination.

4,169,647

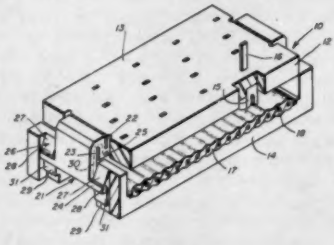
INTEGRAL LOW PROFILE LATCH FOR A FLAT CABLE CONNECTOR

Robert G. Knowles, Litchfield, and Robert A. Domke, Newtown, both of Conn., assignors to Litton Systems, Inc., Oakville, Conn.

Filed Jun. 1, 1978, Ser. No. 911,214

Int. Cl.[2] H01R *13/38*

U.S. Cl. 339—99 R **5 Claims**



1. In a connector for terminating a flat multi-conductor cable and including a pressure member and a molded contact support in which is mounted a plurality of insulation displacement contacts, the combination comprising:

latch means for coupling said contact support to said pres-

sure member, said latch means comprising a beam attached at one end to said contact support and terminated at the other end by a latching bar,

means along said beam for increasing the effective length thereof whereby the beam length measured along the beam from the point of attachment to the latching bar is greater than the distance measured along a straight line from the point of attachment to the latching bar, and

first catch means on said pressure member for retaining said latching bar in a first position.

4,169,648

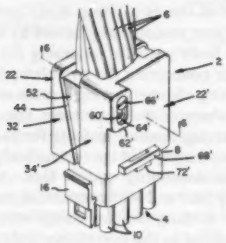
STRAIN RELIEF AND BACK COVER FOR ELECTRICAL CONNECTOR

Stanford C. Moist, Jr., Hummelstown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 1, 1978, Ser. No. 911,643

Int. Cl.[2] H01R *13/58*

U.S. Cl. 339—103 R **10 Claims**



1. A hermaphroditic part which, with an identical part, is intended to be mounted on an electrical connector to form a back cover and strain relief for said connector,

said hermaphroditic part being of a molded insulating material and comprising a rearward end and first, second, and third sidewalls extending from said rearward end to a forward end, said first and second sidewalls being parallel to each other, said third sidewall extending normally of said first and second sidewalls, said hermaphroditic part being open at said forward end and being open on the side which is opposite to said third sidewall, said first and second sidewalls having free edges which are remote from said third sidewall,

a shoulder on the external surface of said first sidewall extending from said forward end towards said rearward end, said first sidewall having a recessed external surface between said shoulder and said free edge, of said first sidewall,

mounting means for mounting said hermaphroditic part on a connector housing with said forward open end in partially surrounding relationship to said housing, and

means for securing said heraphroditic part to an identical part which is in opposed relationship to said part whereby, upon mounting said hermaphroditic part and an identical part on the rearward face of a connector housing with the conductors of said housing extending between the rearward ends of said parts, the internal surfaces of said second sidewalls of each of said parts will be against said recessed surfaces of the other one of said parts and said conductors will be clamped between the edges of said rearward ends of said parts.

4,169,649

CONNECTORS FOR USE IN FRAMES FOR HOLDING CIRCUIT CARDS

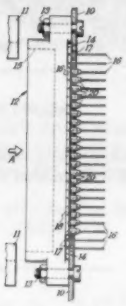
Anthony J. R. Henley, Chandler's Ford, and Geoffrey W. Nutt, Eastleigh, both of England, assignors to Vero Electronics Limited, Eastleigh, England

Filed Nov. 15, 1977, Ser. No. 851,775

Claims priority, application United Kingdom, Dec. 16, 1976, 52649/76

Int. Cl.[2] H01R *3/06, 13/46*

U.S. Cl. 339—176 M **2 Claims**



1. A frame for holding circuit boards, which comprises a metal back plate, pairs of opposed, channel-section guides, disposed at right angles to and extending forwardly from the back plate, for receiving the edges of circuit boards, connectors mounted on the front of the back plate for establishing electrical contact with circuits on the boards fitted into the guides, each connector including a plastics moulding, having a plane rear face and a recess on its front surface for cooperation with a board and carrying metal contact pins which project from its rear face through holes in the back plate, and an insulator disposed between the rear face of each connector and the back plate, the insulator consisting of at least one strip of plastics material having at least one row of holes to receive said contact pins on the connector and tubular extensions which surround the portions of said contact pins which extend through the holes in the back plate, said plastics material and the tubular extensions being adapted to be removed enabling electrical contact to be established between said metal contact pins and said metal back plate by removal of the intervening plastics material, and each connector has fitted to each rear face an insulator including a plurality of differently colored strips of plastic material which abut end to end.

4,169,650

WIRE-WRAP ASSEMBLY CONNECTOR

William E. Schweizer, Philadelphia, Pa., assignor to EBY Company, Philadelphia, Pa.

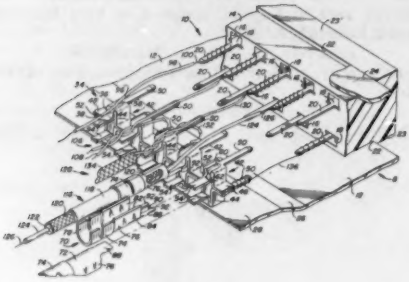
Filed Sep. 20, 1978, Ser. No. 944,087

Int. Cl.[2] H01R *13/02*

U.S. Cl. 339—198 R **14 Claims**

1. A terminal for use in a wire-wrap connector assembly of the type that includes a base and a cover and where said base and said cover support a plurality of receptacles arranged in a row; said terminal comprising an elongated strip of electrically conductive material, said strip to be supported by said base and said cover, said strip including a plurality of generally "U" shaped elements disposed along its length, at least some of said "U" shaped elements corresponding to some of said receptacles and including two sides interconnected by a base with adjacent "U" shaped elements being connected by webs, each

of said bases including means extending toward said receptacles for being electrically coupled to an electrical conductor,



and said bases include means extending away from the receptacles for engagement with another conductor.

4,169,651

CONNECTOR

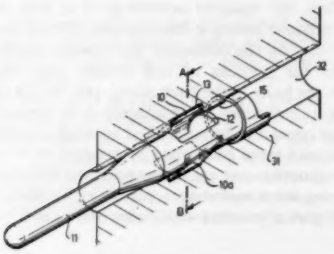
Wolfgang Hanke, Obersulm, Fed. Rep. of Germany, assignor to Nopa GmbH, Kirchardt, Fed. Rep. of Germany

Filed Sep. 10, 1976, Ser. No. 722,206

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1976, 2616621

Int. Cl.[2] H01R *9/08*

U.S. Cl. 339—217 R **11 Claims**



1. A connector assembly comprising:

a connector housing;

a bore in said connector housing;

a stop chamber in said bore;

a contact pin rotatably received by said bore for removingly mating with said stop chamber, said contact pin having a contact end extending from said connector housing when said contact pin is received by said bore, a terminal receiving end and at least one aperture between said contact end and said terminal receiving end; and resilient locking tab means attached, at one end, to said contact pin proximate said aperture for maintaining said contact pin in either a lock state or a release state with respect to said connector housing, said lock state comprising the engagement of said locking tab means with said stop chamber when said pin is inserted into said bore, said release state comprising the retraction of said locking tab means into said aperture when said connector pin is rotated within said bore.

4,169,652

METHOD AND APPARATUS FOR CONNECTING ELECTRICAL CONDUCTORS

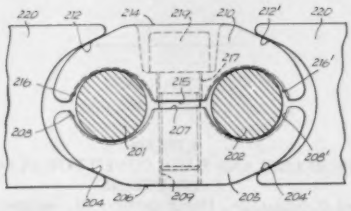
Max Höckele, Bergien-Steinach, and Helmut Ruff, Ostfildern, both of Fed. Rep. of Germany, assignors to Karl Pfisterer Elektrotechnische, Stuttgart, Fed. Rep. of Germany

Filed Oct. 5, 1977, Ser. No. 839,585

Claims priority, application South Africa, Apr. 29, 1977, 77/2589

Int. Cl.[2] H01R *11/26*

U.S. Cl. 339—246 **20 Claims**



1. A clamp for connecting two electrical conductors of circular cross-sectional shape such as cables for switchgear, or the like, comprising a clamp body having at least two parts of highly electrically conductive material such as aluminum alloys, at least one of the two clamp body parts being transversely elastic, at least one channel formed by aligned grooves in the two clamp body parts for clamping the conductors, at least one screw for connecting the two clamp body parts, said at least one clamping channel having a cross-section deviating from the circular shape of the conductors, the outer surface of the clamp body having bearing surfaces for receiving a pressing tool means for pressing said two clamp body parts together and for elastically deforming said at least one transversely elastic clamp body part and said conductors, and wherein said at least one screw holding the two clamp body parts together is of the same material as the two clamp body parts.

4,169,653

ELECTRICAL TERMINAL

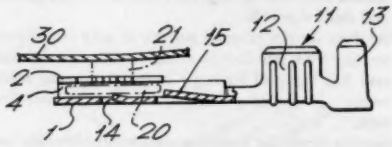
Heinrich W. Nix, Walldorf, and Eike Koster, Eppertshausen, both of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 1, 1978, Ser. No. 911,742

Claims priority, application United Kingdom, Jun. 4, 1977, 23865/77

Int. Cl.[2] H01R *13/12*

U.S. Cl. 339—253 R **1 Claim**



1. An electrical terminal stamped and formed from a coplanar sheet of conductive material, comprising,

a. an elongated base having a wire connecting portion at the back end and edge portions along either side thereof adjacent the front end, said edge portions being bent upwardly and inwardly over the base to define a passageway therebetween;

b. serrations on the facing, free end sides of the edge portions overlying the base, said serrated, free end sides cooperating to define an axially extending slot therebetween, said

slot being narrow adjacent the front end of the base and wider towards the back end;

c. a projection extending obliquely upwardly from the base towards the slot; and

d. a retaining lance, positioned between the projection and the back end, extending obliquely upwardly from the base towards the front end,

said terminal being adapted to slidingly receive a flanged stud with the flange being positioned in the passageway and being biased upwardly against the overlying edge portions by the projection, and with the stud passing through the slot and being gripped by said serrations, further, forward movement being arrested by the narrow portion of the slot and rearward movement being prevented by the retaining lance engaging the flange.

4,169,654

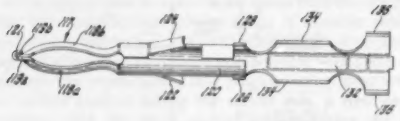
PIN TYPE ELECTRICAL CONTACT TERMINAL

Robert G. Plyler, Vienna, and Lyle B. Suverison, Fowler, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 798,569, May 19, 1977, abandoned. This application Feb. 23, 1978, Ser. No. 880,439

Int. Cl.[2] H01R *13/06*

U.S. Cl. 339—252 P 3 Claims



2. In a one-piece, sheet metal pin type electrical contact terminal having a forward probe comprising a plurality of arms integrally connected to and extending generally longitudinally from one end of a split sleeve and terminating in a tip which engages a tip of another arm to form a slip joint which permits elongation of the probe while buttressing each arm to stiffen its individual deflection characteristics in the radially inward direction upon insertion of the probe into an associated socket connector terminal the improvement comprising an integral tab at the end of one of said engaged tips which is bent over the other of said engaged tips to protect against the engaged tips being spread apart.

4,169,655

PROTECTIVE DEVICE FOR PROTECTION AGAINST RADIATION DURING WELDING

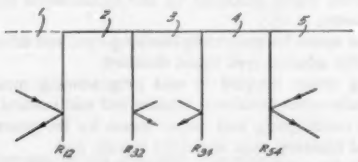
Jan R. Jacobsson, Taby, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Continuation-in-part of Ser. No. 640,247, Dec. 12, 1975, abandoned, which is a continuation-in-part of Ser. No. 451,165, Mar. 14, 1974, abandoned. This application Dec. 23, 1976, Ser. No. 753,627

Claims priority, application Sweden, Dec. 23, 1975, 7514649; Dec. 23, 1975, 7514650

Int. Cl.[2] G02B *5/28, 5/23*

U.S. Cl. 350—1.7 24 Claims



1. A protective device for protection against radiation, wherein a light source of emission mainly about a certain wavelength λ, is present in the surrounding region, said protective device including an interference filter comprising:

a spectrally selective portion having a pass band for mainly the wavelength λ; and

an absorbing portion on each side of said spectrally selective portion, said absorbing portion being adapted to hold the reflectance at least over the entire visible spectrum in the boundary surface between the interference filter and the surrounding region at a level below 15%, each of the absorbing portions including alternating layers of chromium and a non-absorbing material, the non-absorbing material layers being the outermost layers of said absorbing portions, and the non-absorbing material being selected from the group consisting of SiO_2 and Al_2O_3.

4,169,656

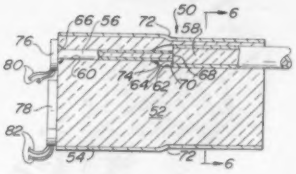
FIBER OPTIC INTERFACE FOR COMBINED SIGNAL TRANSMISSION AND DETECTION

Malcolm H. Hodge, Claymont, Del., assignor to TRW Inc., Los Angeles, Calif.

Filed Sep. 30, 1977, Ser. No. 838,333

Int. Cl.[2] G02B *5/14*

U.S. Cl. 350—96.15 11 Claims



1. A fiber optic interface for combined signal transmission and detection via first and second optic fibers, said interface including a separate housing body having an elongated channel extending therethrough, a light source and light sensitive means, said housing body comprising translucent material, said first optic fiber being secured in one end of said channel with the outermost end of said first optic fiber being aligned with said light source, said second optic fiber being in the other end of said channel, with the innermost end of said second fiber being disposed adjacent the innermost end of said first fiber, said light sensitive means being connected to said housing body, said ends of said fibers being arranged so that light passes between said first fiber and said second fiber and vice versa, and means for directing a portion of light to said light sensitive means during a light transmission from said second to said first fiber, said light sensitive means being responsive to said light portion directed thereto.

4,169,657

LAMINATED STRENGTH MEMBERS FOR FIBER OPTIC CABLE

Kenneth L. Bedard, Willimantic, Conn., assignor to Akzona Incorporated, Asheville, N.C.

Filed Mar. 2, 1978, Ser. No. 882,832

Int. Cl.[2] G02B *5/14*

U.S. Cl. 350—96.23 12 Claims

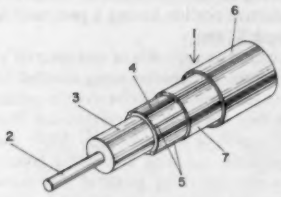
1. A fiber optic cable comprising:

a fiber optic core including at least one optical fiber adapted to receive optical communication signals;

at least one elastic strength member substantially straight and parallel to said fiber optic core; said strength member being in a stretched condition;

means for maintaining said strength member substantially

straight and in a stretched condition whereby said strength member is adapted to apply a force in the opposite direction to longitudinal stress forces on said cable for protecting said optical fiber from longitudinal stress.



4,169,658

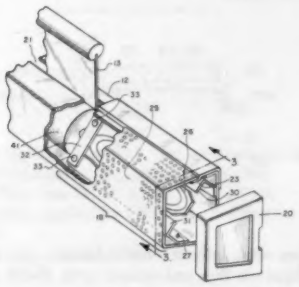
PICTURE SCREEN

Donald J. Brown, Naperville, Ill., assignor to Knox Manufacturing Co., Wood Dale, Ill.

Filed Jan. 24, 1978, Ser. No. 871,960

Int. Cl.[2] G03B *21/56*

U.S. Cl. 350—118 **14 Claims**



1. A picture screen device, comprising:

an elongated hollow casing having two ends and a longitudinally extending slot;

an elongated spring-actuated roller journaled in the casing;

a flexible screen web secured to the roller and adapted to be unwound from a closed position to an open position, the screen web being wound upon the roller in said closed position and being unwound from the roller in an exposed open position;

a hollow speaker housing secured to one end of said casing;

a speaker assembly mounted within the speaker housing; and

circuit means for transmitting audio signals to said speaker assembly.

4,169,659

MULTIPLE STANDARD TELEVISION SYNC GENERATOR

Frank J. Marlowe, Kingston, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 5, 1978, Ser. No. 903,071

Claims priority, application United Kingdom, May 30, 1977, 22812/77

Int. Cl.[2] H04N *5/06*

U.S. Cl. 358—150 **18 Claims**

1. A television synchronizing signal generator comprising:

a source of clock pulses;

a synchronous horizontal counter responsive to said clock pulses from said source for producing signals having frequencies which are integral multiples of the horizontal line frequency of the television signal;

a vertical counter coupled to an output of said synchronous horizontal counter for producing signals having frequencies which are integral divisions of twice the line frequency of the television signal, said vertical counter being clocked by a signal which is advanced in phase relative to the lowest frequency signal produced by said synchronous horizontal counter;

output means for generating blanking, sync and drive signals;

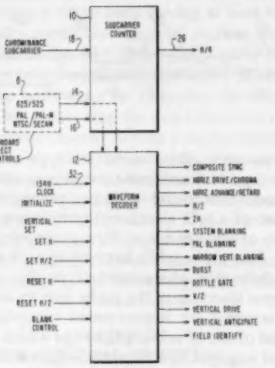
gating means coupled to said synchronous horizontal counter and said vertical counter for conditioning said output means for the generation of said blanking, sync and drive signals; and

means for rendering said output means responsive to said clock pulses so that said blanking, sync and drive signals are phase-related to said clock pulses.

4. A multiple standard televison synchronizing signal generator comprising:

a source of clock pulses which provides pulses at a first rate for a 525-line sync standard and at a second rate for a 625-line sync standard;

means for programming the synchronizing signal generator for operation according to a selected sync signal standard and having a first input terminal for selecting a particular horizontal line frequency and a second input terminal for selecting a particular sync signal standard;



a synchronous horizontal counter responsive to said clock pulses from said source for producing signals having frequencies which are integral multiples of the selected horizontal line frequency;

a vertical counter coupled to an output of said synchronous horizontal counter and programmed by said programming means for operation at a selected horizontal line frequency for producing signals having frequencies which are integral divisions of twice the selected horizontal line frequency, said vertical counter being clocked by a signal which is advanced in phase relative to the lowest frequency signal produced by said synchronous horizontal counter;

output means for generating blanking, sync and drive signals of the selected sync signal standard;

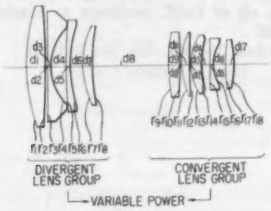
gating means coupled to said programming means, said synchronous horizontal counter and said vertical counter for conditioning said output means for the generation of said blanking, sync and drive signals; and

means for rendering said output means responsive to said clock pulses so that said blanking, sync and drive signals are phase-related to said clock pulses.

4,169,660
WIDE-ANGLE ZOOM LENS SYSTEM

Soichi Nakamura, Kamakura, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Continuation-in-part of Ser. No. 640,228, Dec. 12, 1975, abandoned. This application Dec. 20, 1977, Ser. No. 863,338
Claims priority, application Japan, Dec. 28, 1974, 49-1293; Oct. 9, 1975, 50-122133; Oct. 29, 1975, 50-129186
Int. Cl.² G01B *15/16*
U.S. Cl. 350—176 **25 Claims**

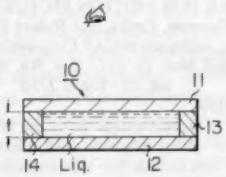


1. A wide-angle zoom lens system comprising a divergent lens group and a convergent lens group in the order from the object side, both of said groups being movable on the optical axis of the lens system to vary the air space between the groups so that the magnification of the image is variable while the image plane is maintained at a fixed position, the divergent lens group including four air-spaced components which are, in the order from the object side, a first positive component with the more curved surface facing the object side, a first negative component with the more curved surface facing the image side, a second negative component with the more curved surface facing the image side and a first positive meniscus component convex to the object side, said first positive component and said first negative component defining therebetween an air chamber having convergent power, said first negative component and said second negative component defining therebetween an air chamber having divergent power with its more curved surface facing the object side, the axial space between said second negative component and said first positive meniscus component being greater than the space between said first positive component and said first negative component, said covergent lens group including at least four positive components and a negative component, all components being separated from one another.

4,169,661
THERMAL-OPTICAL CONVERTER

Tsutomu Yamada, Higashimurayama, and Jun Maeno, Sekimachi, both of Japan, assignors to Hideki Ishii, Tokyo, Japan

Filed Apr. 27, 1977, Ser. No. 791,526
Claims priority, application Japan, May 4, 1976, 51-049856
Int. Cl.² G01D *15/34*
U.S. Cl. 350—353 **26 Claims**



1. A thermal-optical converter comprising:
(a) a closed vessel;
(b) a heat-sensitive material enclosed in said vessel, said material consisting of an aqueous liquid solution of a water-soluble non-ionic polysaccharide derivative dissolved therein, said polysaccharide derivative exhibiting a reversible clouding phenomenon upon raising and lowering of the temperature of the material; and
(c) a first transparent window formed in at least one part of said closed vessel so that said aqueous solution enclosed therein is visible through said window.

4,169,662
METHOD AND APPARATUS FOR PRODUCING ACOUSTIC WAVES BY LASER PULSES

Walter Kaule, and Erik Primbsch, both of Cologne, Fed. Rep. of Germany, assignors to Krautkramer-Branson, Incorporated, Stratford, Conn.

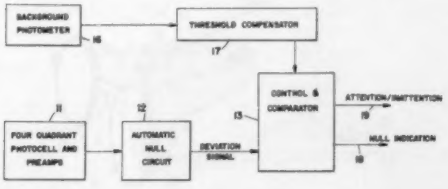
Filed Dec. 1, 1977, Ser. No. 856,337
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1977, 2707883
Int. Cl.² G02F *1/11*
U.S. Cl. 350—358 **12 Claims**

1. Method for producing free of physical contact on the surface of a light absorbing workpiece an ultrasonic wave useful for nondestructively testing such workpiece by ultrasonic energy comprising:
disposing a laser source adapted to produce a beam of coherent light for illuminating a workpiece surface;
causing said source to illuminate portions on the workpiece surface with coherent light pulses in a Fresnel zone pattern,
whereby the coherent light pulses responsive to the thermal effect manifest in the workpiece generate fundamental ultrasonic waves which propagate from the respective zones and provide a resultant spherical wave front propagating toward a central focal point.

4,169,663
EYE ATTENTION MONITOR

William C. Murr, Piedmont, Calif., assignor to Synemed, Inc., Berkeley, Calif.

Filed Feb. 27, 1978, Ser. No. 881,794
Int. Cl.² A61B *3/14*; G01J *1/20*
U.S. Cl. 351—7 **7 Claims**



1. A device for monitoring the position of an image eye, comprising a multi-faceted photocell detector on which falls said image, first differential amplifier means connected to

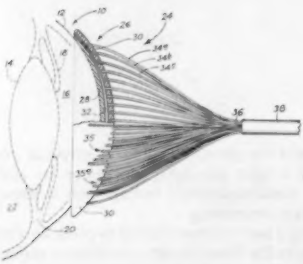
opposed facets of said photocell detector for amplifying the difference of the signals therefrom; second differential amplifier means connected to all of said facets of said photocell detector for summing all of the signals therefrom; automatic null circuit means associated with each of said first and second differential amplifier means for storing an initial output voltage level related to the position and intensity of said image, said automatic null circuit means providing a portion of the input to said first and second differential amplifier means; means for generating absolute value signals from the output of said first and second differential amplifier means; means for summing said absolute value signals to form an average eye attention signal; third differential amplifier means for amplifying the difference between said average eye attention signal and a selectively variable voltage; and threshold detector means connected to the output of said third differential amplifier means for generating an output control signal.

4,169,664

APPARATUS FOR DETERMINING PERIPHERAL VISION

Paul F. Bailey, Jr., 4885 NW. Barnes Rd., Portland, Oreg. 97210, assignor to Synemed, Inc., Berkeley, Calif.

Filed Nov. 30, 1977, Ser. No. 855,880
Int. Cl.[2] A61B *3/02*; G02C *7/04*
U.S. Cl. 351—23 **16 Claims**



1. Apparatus for use in determining the peripheral vision extent of an eye comprising:

contact means for detachable fitting on the cornea; and

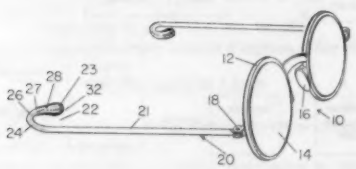
light emitting means operable for selectively directing light into the eye including multiple optical fibers distributed over the area bounded by the periphery of said contact means at discrete locations radially spaced from the central axis of said contact means.

4,169,665

EYEGLASS BOW CONSTRUCTION

John R. McCulloch, 753 Cindy La., Petaluma, Calif. 94952

Filed Aug. 15, 1977, Ser. No. 824,628
Int. Cl.[2] G02C *5/14*
U.S. Cl. 351—123 **12 Claims**



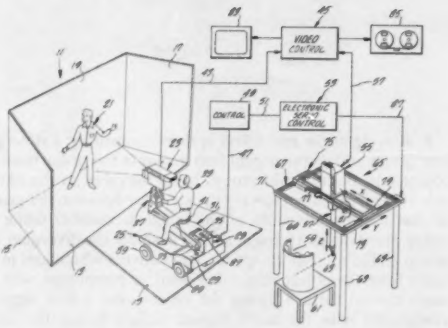
1. Eyeglass bows for eyeglasses having a forward end having attachment means for attachment to a frame, an intermediate portion and a distal end portion, said end portion including first means for engaging a wearer's ear so that downward rotation of the bow will impart a downward reactive force thereto, and second means for engaging a wearer's ear forward of said first means so that downward rotation of the bow will impart an upward reactive force thereto.

4,169,666

FOREGROUND STABILIZATION SYSTEM FOR USE IN COMPOSITE PHOTOGRAPHY

Dan Slater, La Habra; John C. Gale, Hollywood, and Joseph L. Matza, Malibu, all of Calif., assignors to Magicam, Inc., Hollywood, Calif.

Filed Jan. 23, 1978, Ser. No. 871,757
Int. Cl.[2] G03B *21/32*
U.S. Cl. 352—85 **19 Claims**



1. In a composite photography system of the registered matte type having foreground and background cameras, including objects constituting a scene for the foreground camera, the relation between each camera and a scene as received by its respective camera, the perspective of the cameras being coupled for synchronizing the movement of the background camera in relation to its scene with the movement of the foreground camera in relation to its scene along X, Y, Z, yaw and pitch axes, a foreground stabilization system for correcting for rotational movement of the foreground camera dolly, said system comprising:

means for sensing rotational movement of said foreground camera dolly about an axis vertical to the ground plane of the foreground scene, said means generating an output signal indicative of rotation;

means responsive to the output signal from said rotational movement sensing means for generating rotational error correction signals; and

means responsive to said rotational error correction signals for correcting for the sensed rotational movement.

4,169,667

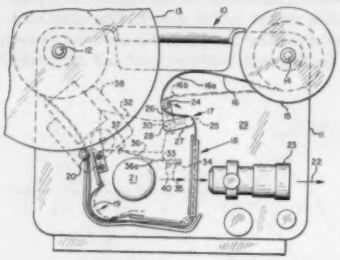
FILM BUFFER FOR MOTION PICTURE PROJECTORS

Donald I. Loofbourow, Canby, and Robert E. Lach, Beaverton, both of Oreg., assignors to GAF Corporation, New York, N.Y.

Filed Mar. 23, 1977, Ser. No. 780,536
Int. Cl.[2] G03B *1/56*
U.S. Cl. 352—159 **9 Claims**

1. In a motion picture projector of the type having an electric drive motor with a magnetic field, a film supply reel and a film transport mechanism for incrementally advancing each frame of the film through a projection gate, an improved buffer for the film comprising a bracket pivotally disposed between the supply reel and the film transport mechanism; a pair of rollers for the film rotatably connected to said bracket to form a loop in the film in its path of travel to exert an unwinding force upon the supply reel; and a steel counterweight fixedly connected to the bracket and swingable therewith to pivotally bias the same into a direction to increase the film loop size to

hold the bracket against movement under normal tension of the film and to decrease the film loop size and exert increased force upon the film to unwind the supply reel when said tension exceeds a predetermined limit; said counterweight being disposed within the magnetic field of the drive motor to damp its motion and reduce vibration and noise.

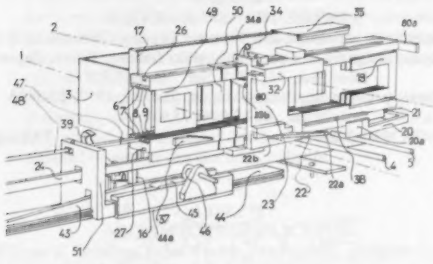


4,169,668

TRANSPARENCY PROJECTOR COMPRISING A PLURALITY OF OPTICAL SYSTEMS

Georges E. Grenier, Paris, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly sur Seine, France

Filed Feb. 1, 1978, Ser. No. 874,028
Claims priority, application France, Feb. 4, 1977, 77 03113
Int. Cl.[2] G03B *21/14, 23/04*
U.S. Cl. 353—90 **29 Claims**



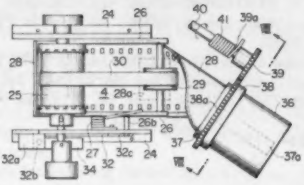
1. A transparency projector having optical axes through projection windows in which the transparencies are removed from the compartments of a single magazine and are replaced therein in identical manner after projection, said projector comprising at least two juxtaposed optical systems allowing the simultaneous or successive projection of as many transparencies as there are optical systems, each optical system being associated with an advance conveyance channel and a return conveyance channel, a drive assembly moving the transparencies in the respective advance conveyance and return conveyance channel between their respective compartment and projection window, wherein the conveyance channels are in the form of guide slots transverse with respect to the optical axes, and transfer means located opposite the magazine with respect to the optical systems for the simultaneous transfer of the transparencies from the advance guide slots to the return guide slots so that each transparency, under the effect of the drive assembly, effects a forward movement and a return movement in the course of which it moves twice in the front of the projection window in each optical system.

4,169,669

FILM WINDING DEVICE FOR SLIDE PROJECTORS

Tadakazu Endo, Fuchiu; Susumu Nomura; Masato Matsumoto, both of Tokyo, and Kojiro Takahashi, Yokohama, all of Japan, assignors to Shinano Kikaku Company Limited, Tokyo, Japan

Filed Mar. 22, 1978, Ser. No. 888,986
Claims priority, application Japan, Mar. 24, 1977, 52-31627; Mar. 24, 1977, 52-34730[U]; Mar. 24, 1977, 52-34731[U]
Int. Cl.[2] G03B *1/48*
U.S. Cl. 353—95 **8 Claims**



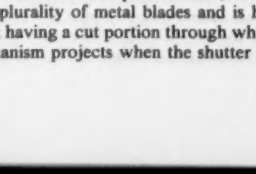
1. A film winding device for slide projectors, comprising:
a projecting frame provided within a projector body;
a film pressing plate means arranged adjacently to said projecting frame and capable of pressing a strip film to be projected against said projecting frame;
a sprocket rotatably mounted on said projector body below said film pressing plate means and capable of feeding said film;
a film guide provided below said sprocket and having one end portion enclosing a part of said sprocket and having the other end portion formed to be spiral and capable of guiding the film fed by the sprocket;
a leading ring secured to the other end portion of said film guide;
a rotary ring rotatably mounted on said leading ring and a film housing case capable of being removably mounted to said rotary ring;
a driving mechanism connected with said rotary ring and capable of rotating as synchronized with said sprocket, whereby said strip film may be successively wound in by the cooperative action of said film guide and leading ring to be positioned so that the tip of the film lies at the outside within said film housing case.

4,169,670

DEVICE FOR INDICATING THE COMPLETION OF WINDING OF THE SHUTTER OF A CAMERA

Katsuhiko Nomura, Kawagoe, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 2, 1977, Ser. No. 830,287
Claims priority, application Japan, Sep. 3, 1976, 51/11853
Int. Cl.[2] G03B *17/00*
U.S. Cl. 354—289 **2 Claims**



1. In a camera with a focal plane shutter, wherein the shutter comprises a plurality of metal blades and is housed within a shutter block having a cut portion through which a part of the shutter mechanism projects when the shutter is wound, a de-

vice for indicating the completion of the winding of the shutter comprising:

an indicating lever mounted within the camera body with one end of the lever positioned to engage said part of the shutter mechanism and the other end viewable through a window in the camera body, wherein said part of the shutter mechanism is a metal shutter blade.

4,169,671

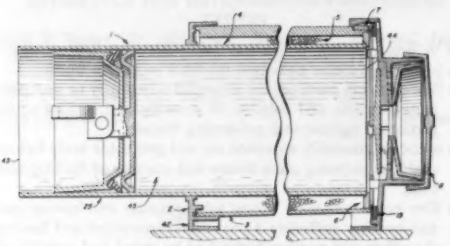
VARIABLE VOLUME CONTAINER FOR PROCESSING PHOTOGRAPHIC MATERIALS

Jimmie G. Culler, Dexter, Mich., assignor to PhotoSystems, Dexter, Mich.

Continuation of Ser. No. 682,883, May 3, 1976, abandoned, which is a continuation of Ser. No. 487,541, Jul. 11, 1974, abandoned. This application Apr. 13, 1978, Ser. No. 896,063

Int. Cl.[2] G03D *17/00*

U.S. Cl. 354—312 **8 Claims**



1. A variable volume daylight photographic developing tank for processing photographic material through the application of photographic processing fluid to said photographic material comprising:

a deposit container for holding said photographic material in a position to be contacted by said photographic processing fluid during processing and having at least one open end;

a plug means insertable through said open end of said container and movable within said container for varying the volume within said container to attain the minimum internal container volume necessary for the amount of photographic material to be processed; and

an amount of said photographic processing fluid proportional to said minimum internal container volume partially filling said minimum internal container volume during processing.

4,169,672

METHOD AND APPARATUS FOR PHOTOELECTROPHORETIC-COLOR-PROCESS COPYING

Berthold Fergg, Taufkirchen, and Wolfgang Zahn, Munich, both of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany

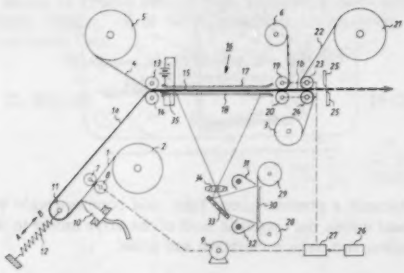
Filed Dec. 7, 1977, Ser. No. 858,165

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1976, 2656657

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—3 P **6 Claims**

1. In a photoelectrophoretic-color-process copying machine, in combination, an exposure station; guiding means for guiding a first and a second electrode web, of which at least one is transparent, along respective transport paths both of which pass through the exposure station; toner-applying means located along the first web transport path upstream of the exposure station operative for applying to the first web a uniform layer of toner suspension; sandwiching means located along the first and second web transport paths upstream of the exposure station and downstream of the toner-applying means, operative for combining the coated first web and the second web into a sandwiched film pack in which the toner-suspension layer is confined between the first and second webs; transport means operative for transporting the webs along their respective paths, effecting intermittent transport of at least that section of the webs constituting the sandwiched film pack located at the exposure station, and despite said intermittent transport maintaining the relative movement between the toner-applying means and the first web unidirectional and of constant speed;



means at the exposure station operative for projecting the whole image to be copied onto the toner suspension layer of a film pack section through the transparent web thereof while such section is at a standstill at the exposure station, and photoelectrophoretically producing a corresponding color toner image; and transfer means downstream of the exposure station operative for transferring the color toner image onto copy material.

4,169,673

IMAGE TRANSFER DEVICE

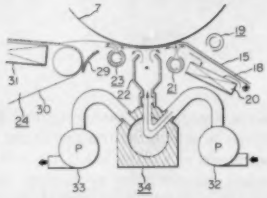
Yasushi Sato, Kawasaki, and Tsutomu Toyono, Ohizumi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 30, 1977, Ser. No. 865,925

Claims priority, application Japan, Jan. 14, 1977, 52-3498

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—3 TR **7 Claims**



1. An image transfer device having a transfer station where a continuous transfer material is brought into contact with an image formed on an image bearing member, and the image is transferred onto a transfer material, said device comprising:

means for feeding and guiding the continuous transfer material to the transfer station;

means for transferring the image from the image bearing member onto the transfer material;

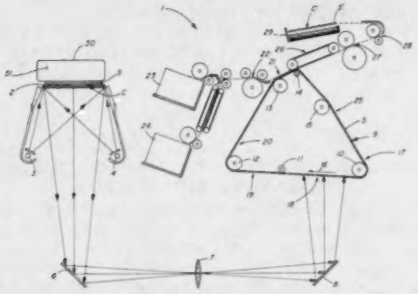
air flow means for controlling a flow of air to and from said transfer means to force the transfer material into contact with the image bearing member during image transfer, and to separate and remove the transfer material from contact with the image bearing member; and

means for guiding and transporting the continuous transfer material away from the transfer station.

4,169,674
RECIRCULATING SHEET FEEDER

Matthew J. Russel, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 523,610, Nov. 13, 1974, abandoned. This application Jan. 8, 1976, Ser. No. 647,683
Int. Cl.[2] G03G *15/00*; B65H *3/00, 9/06, 29/00*
U.S. Cl. 355—14 9 Claims



2. A recirculating document feeder adapted to circulate individual document sheets from a stack of such sheets through an exposure station of copying apparatus where the respective sheets are exposed to make copies and back to the stack, the copying apparatus delivering copy sheets image-side-up and with each copy sheet being on top of any previously delivered copy sheets, said feeder comprising:

means for receiving and supporting a stack of document sheets image-side-up, in sequence, with the last sheet of the document on the bottom of the stack and with the stack spaced from the exposure station;

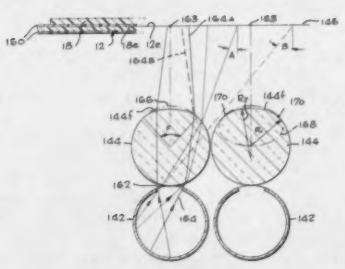
means for circulating the document sheets comprising means (1) for removing the bottom-most sheet from the stack and for presenting the removed sheet to the exposure station image-side-down for copying, and (2) for returning the copied sheet to the top of the stack with the image-side-up; and

means for controlling said circulating means so that the document sheets are sequentially circulated to the exposure station one or more times to produce one or more collated copies of the document sheets.

4,169,675
MICROFICHE DUPLICATOR

William E. Roberts, Palos Verdes Penn., Calif., assignor to AM International, Inc., Los Angeles, Calif.

Continuation of Ser. No. 652,635, Jan. 26, 1976, abandoned. This application Apr. 7, 1978, Ser. No. 894,219
Int. Cl.[2] G03B *27/04*
U.S. Cl. 355—85 5 Claims



1. A contact copying apparatus comprising:

means for holding a light-transmitting master containing an image to be copied and a sheet of copy material, facewise adjacent to one another at a predetermined imaging plane;

a plurality of elongated and closely spaced aperture lamps, each having a tube of substantially circular cross section with light emanating principally from the inside of the tube, and an elongated aperture through which light is emitted, each of said lamps being spaced approximately the same distance from said predetermined imaging plane; and a plurality of elongated and closely spaced lenses, each positioned between one of said aperture lamps and said imaging plane for directing light from said aperture lamps onto said imaging plane;

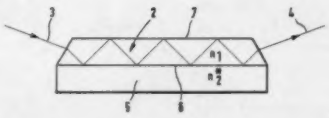
each lens being close enough to the corresponding lamp so that substantially all light emitted from the lamp aperture can reach only the lens immediately in front of that lamp, but each lens being spaced from the position of the master by more than the radius of the lens to enable spreading out of the light to more evenly distribute the light onto the imaging plane;

each of said lenses being formed by a plurality of lens segments arranged along an axis parallel to said elongated aperture and a plurality of opaque barriers between said lens segments, said barriers being of a material having an index of refraction which is greater than that of air but lower than the index of refraction of the adjacent lens segment, whereby well collimated light rays are passed through said lenses and poorly collimated light rays are absorbed by said barriers.

4,169,676
METHOD FOR DETERMINING THE CONTENTS OF METABOLIC PRODUCTS IN THE BLOOD

Nils Kaiser, Germeringer Str. 36, Gauting, Fed. Rep. of Germany

Filed Feb. 17, 1977, Ser. No. 769,777
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1976, 2606991
Int. Cl.[2] G01N *33/16*
U.S. Cl. 356—39 9 Claims



1. A method of determining the amounts of metabolic products in blood comprising the steps of placing an ATR plate against a living blood supplied living biological tissue, guiding a laser beam through said ATR plate, and detecting the intensity of said beam after being affected by the blood containing the metabolic elements.

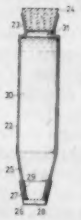
4,169,677
METHOD AND APPARATUS FOR DIAGNOSING THE CONDITION OF OIL-WETTED PARTS

David Luria, Tel Aviv, Israel, assignor to Panel Laboratories Ltd., Ramat Aviv, Israel

Filed May 4, 1977, Ser. No. 793,755
Claims priority, application Israel, May 3, 1976, 49518
Int. Cl.[2] G01N *33/28, 15/04*
U.S. Cl. 356—70 10 Claims

1. A method of diagnosing the condition of oil-wetted parts subject to wear, comprising the steps of: extracting a specimen of the used oil from the oil-wetted parts; introducing said specimen into one end of a holder containing a liquid medium; separating the particles in the specimen into a plurality of samples according to the different mobility rates, due to difference in size and density, of the particles through the liquid medium during the centrifuging of the specimen and liquid medium in the holder for a predetermined period of time; said

plurality of samples being separated by passing the particles and liquid medium through a screen at the opposite end of the holder, which screen is of larger mesh than the largest particles in the specimen to provide a uniform dispensing of the samples



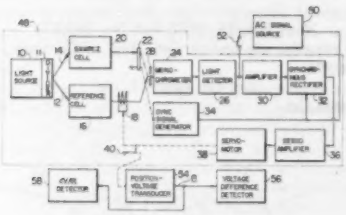
through said opposite end of the holder; and analysing said samples to determine the composition of the particles in each, thereby providing an indication of the identities of the wearing parts and their rates-of-wear.

4,169,678

SPECTROPHOTOMETER

Masaru Inoue, Mito; Makoto Ishikawa, Katsuta, and Kenji Fukuda, Mito, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 29, 1977, Ser. No. 865,487
Claims priority, application Japan, Jan. 7, 1977, 52-386
Int. Cl.[2] G01J *3/42*
U.S. Cl. 356—321 **7 Claims**



1. A spectrophotometer comprising:

a light radiating source;

an optical system dividing the light emitted from said light radiating source into two light beams to direct them toward a light detector through a sample cell and a reference cell respectively, said two light beams being passed through a monochrometer before entering said light detector;

a variable slit for varying the intensity of light entering said light detector;

a chopper acting to alternately introduce said two light beams into said light detector;

an amplifier amplifying the output signal of said light detector, the electrical gain of said amplifier being adjustable;

a synchronous rectifier operating in synchronous relation with the operation of said chopper for the synchronous rectification of the output signal of said amplifier thereby providing an output signal proportional to the intensity difference between said two light beams;

a variable light attenuator for attenuating one of said two light beams;

a servo mechanism moving said variable light attenuator in one direction or the other until the output of said synchronous rectifier becomes null;

an AC signal source generating an AC signal in synchronous relation with the operation of said chopper and applying said AC signal to the input of said amplifier;

position-voltage transducing means generating a position signal representing the position of said variable light attenuator;

voltage difference detecting means detecting the difference between the voltage values of said position signal before and after the application of said AC signal from said AC signal source to the input of said amplifier; and

voltage variation rate detecting means detecting the rate of transient variation with respect to time of said position signal after the application of said AC signal from said AC signal source to the input of said amplifier,

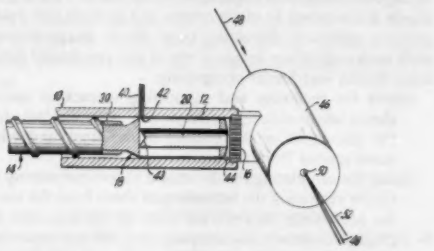
whereby the optical sensitivity of said spectrophotometer is detected by said voltage difference detecting means, and the electrical gain is detected by said voltage variation rate detecting means.

4,169,679

APPARATUS FOR THE EXTRUSION OF CELLULAR THERMOPLASTIC MATERIAL

John C. Miller, Piscataway; Archibald L. Burnett, Warren, and Leonard S. Scarola, Union, all of N.J., assignors to Union Carbide Corporation, New York, N.Y.

Continuation of Ser. No. 713,121, Aug. 11, 1976, abandoned, which is a continuation-in-part of Ser. No. 610,240, Sep. 4, 1975, abandoned. This application Dec. 12, 1977, Ser. No. 859,923
Int. Cl.[2] B28C *7/04*; B29B *1/06, 5/02*
U.S. Cl. 366—76 **9 Claims**



1. An extruder having a hollow barrel, screw means mounted in said barrel to advance material therethrough, mixer head means mounted in said barrel and gaseous blowing agent inlet means positioned in said barrel near the upstream end of said mixer head means, said mixer head means having in the surface thereof a plurality of alternate land means and groove means, said land means having close clearance with the internal walls of said barrel at the point of positioning of said blowing agent inlet means so that said blowing agent inlet means is intermittently opened and closed by said land means to the passage of blowing agent to said plurality of groove means, and land pairs alternately in spaced clearance and close clearance with said walls in the mixing region downstream of said blowing agent inlet means.

4,169,680

METHOD AND APPARATUS FOR MAKING COMPOSITION FRICTION MATERIALS

John B. Littlefield, Belle Haven, Va., assignor to AMSTED Industries Incorporated, Chicago, Ill.

Filed Jul. 25, 1977, Ser. No. 818,831
Int. Cl.[2] B01F *13/06, 15/06*
U.S. Cl. 366—139 **6 Claims**

1. A method of preparing a composition friction material particularly adapted for forming railroad brake shoe liners, said method comprising the steps of:

(1) loading into a mixer a first portion of ingredients including an elastomer, a solvent and nonsolvent absorbing materials,

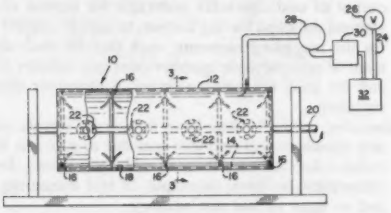
(2) mixing said first ingredient portion with mixing means

carried by said mixer to produce a solvated paste-like substance,

(3) adding into said mixer a second portion of ingredients including curing agents, friction modifiers, solvent absorbing materials and resin,

(4) energizing a vacuum source connected to said mixer to draw off said solvent in said mixture,

(5) mixing said first and second portions with said mixing means to produce a mixture of said ingredients,



(6) adding heat to said ingredients in said mixture carried by said mixer at least during Steps 2 and 5, and

(7) withdrawing said mixture of ingredients from said mixer upon a sufficient amount of said solvent being removed from said mixture by said vacuum source,

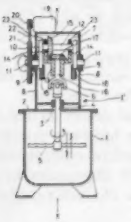
wherein said mixture of ingredients may be conveniently formed into railroad brake shoes.

4,169,681

LIQUID STIRRING APPARATUS

Sei Kato, Nagoya, Japan, assignor to Nihon Senshoku Kikai Kabushiki Kaisha, Aichi, Japan

Filed Nov. 6, 1974, Ser. No. 521,334
Int. Cl.[2] B01F *7/18*
U.S. Cl. 366—244 **4 Claims**



1. An apparatus for stirring a liquid, comprising:

an upright rotary shaft supported for positioning in a liquid in a container and adapted for simultaneous rotation about its own axis and vertical movement;

a stirring blade secured to the lower end of said rotary shaft;

a means for driving said rotary shaft to impart simultaneous rotary and vertical oscillatory movements thereto, said means including

a crank means rotatably supported for rotation about an axis and a motor for driving said crank means;

a crank pin connected to said crank means;

a gear box rotatably attached to said crank pin;

a first bevel gear in said gear box and secured to said crank pin;

a second bevel in said gear box and meshed with said first bevel gear;

a drive shaft extending downwardly from said gear box and engaged with said second bevel gear; and,

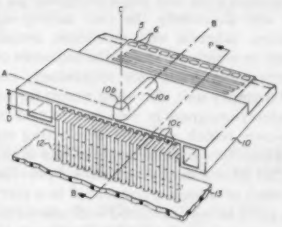
universal joint means connecting said drive shaft and said rotary shaft to rotate said rotary shaft.

4,169,682

PRINTER MECHANISM

Lloyd E. Norman, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 31, 1978, Ser. No. 859,765
Int. Cl.[2] B41J *3/20*
U.S. Cl. 400—120 **24 Claims**



1. A printer mechanism comprising:

(a) a platen;

(b) means for rotatably mounting said platen;

(c) a medium upon which printing is to be accomplished, said medium being disposed adjacent to said platen;

(d) printing means;

(e) holder means for disposing said printing means in printing relationship to said medium and said platen; and

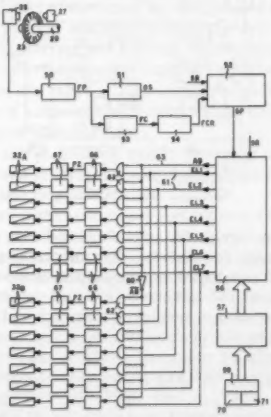
(f) pivoting means for pivoting said holder means about a first and second axes with respect to said platen, said pivoting means including a ball and socket assembly and means for inhibiting said holder means from pivoting about a third axis, said third axis being orthogonal to both said first and second axes.

4,169,683

HIGH SPEED WIRE PRINTING DEVICE

Francesco Bernardis, Ivrea, and Dario Bisone, Montalto Dora, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Dec. 13, 1977, Ser. No. 860,241
Claims priority, application Italy, Dec. 30, 1976, 70141 A/76
Int. Cl.[2] B41J *3/12*
U.S. Cl. 400—124 **1 Claim**



1. A high-speed wire printing device for printing a dot matrix of characters on a recording medium, said device comprising a carriage, a plurality of printing wires mounted on said carriage and actuatable for the printing of said dot matrix, said

wires having printing ends aligned on two sides by side columns, a plurality of electromagnets associated with said wires for the actuation thereof, said electromagnets having an actuation cycle of a predetermined time, moving means for moving said carriage in front of said recording medium at a substantially constant speed so that during said predetermined time said carriage traverses a space substantially equal to twice the distance between two columns of said matrix, and an electronic circuit associated with said electromagnets for actuating both selectively and alternately the two side-by-side columns of printing wires, wherein said electronic circuit comprises a memory unit, in which are stored the sequence of commands of said electromagnets, means for sequentially reading the content of said memory unit, decoding means for selectively actuating said electromagnets in response to said commands, and selecting means which generate a selecting signal for selectively actuating the electromagnets of one of the two columns of wires, wherein said decoding means is provided with a series of outputs each of which is connected to a pair of gates, each one of said gates being associated with one of said electromagnets for the operation of said wires, wherein the electromagnets operating the wires of one predetermined column are activated by the signals of said outputs in response to said selecting signal emitted by said selecting means, wherein an inverting means is provided for generating an inverted signal of said selecting signal and wherein the gates of the electromagnets for one column are operated directly by said selecting signal, while the gates of the electromagnets of the other column are operated by said inverted signal.

4,169,684

CONTROL DEVICE FOR A MATRIX PRINTER

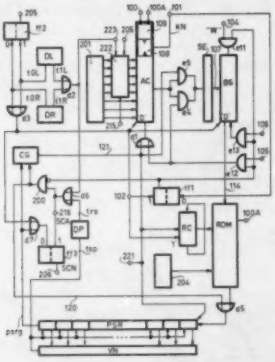
Nico Blom, Rijswijk, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 25, 1977, Ser. No. 854,789

Claims priority, application Netherlands, Jan. 12, 1976, 7613358

Int. Cl.[2] B41J *3/12*

U.S. Cl. 400—124 **4 Claims**



1. A control device for activating recording elements in a recording device for the recording of characters which are composed of dot-shaped or line-shaped elements which are arranged in rows and columns on a record carrier, said recording device including a member driven back and forth in front of the record carrier in a row direction, said member having a least one group of recording elements adapted to record a character element, each group comprising a number of recording elements which at least equals the maximum number of rows of character elements in a character, at least one recording element within a group being associated with each row such that a predetermined row advance is present between successive recording elements of a group and between groups of successive recording elements, the recording elements being staggered in the row direction such that between successive recording elements of a group and between groups of successive recording elements, a predetermined column advance is present, a plurality of groups succeeding each other in the row direction, said control unit comprising:

a buffer memory for receiving characters to be recorded together on a line;

a character generator having a first sub-address input which is connected to an output of said buffer memory for the general addressing of a character;

a dot memory having an input which is connected to an output of said character generator for storing character element data and having outputs to supply control signals for the recording elements, such that for each displacement of said movable member over one column distance, and for each recording element, a character element is supplied;

measuring means for supplying movement signals and position signals to said movable member to activate, for each column displacement thereof, said dot memory through a connection between an output of said measuring means and an input of said dot memory;

a further output of said measuring means being connected to an input of said buffer memory to form, at the start of a line to be recorded by way of a movement of said member in a first direction, a starting address for the buffer memory and a starting condition signal for said character generator;

a chaining unit, an input of which is connected to an output of said measuring means, outputs thereof being connected to an address input of said buffer memory and a second sub-address input of said character generator for supplying a row or column address for a character generally addressed by said first sub-address;

said chaining unit containing the data of said row advances and column advances and a return connection for serially forming for all successive recording elements before movement of said movable member to the next successive column position, on the basis of said starting condition signal and the relevant row advances and column advances an address which is composed of first and second sub-address signals, in said character generator, assisted by the first sub-address signal supplied by said buffer memory, and to regenerate said starting condition signal at the end of the series with an additional unit of column advance in said first direction;

a detection circuit to detect an end-condition signal when a line of characters has been printed;

said character generator comprising:

at least two sets of characters having mutually different dimensions of the character-including-spacing-on-the-line field;

said chaining unit having at least one digital code for each of said character sets;

said measuring means being connected to an input of a starting memory in order to activate per character set one of at least one starting condition signal stored therein per character set for said chaining unit, such that the number of characters recorded per unit of line length can be adjusted under the exclusive control of said digital codes.

4,169,685

TAB LAYOUT DISPLAY FOR A TYPEWRITER

William C. Gruber, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1977, Ser. No. 863,206

Int. Cl.[2] B41J *29/50*

U.S. Cl. 400—705.4 **7 Claims**

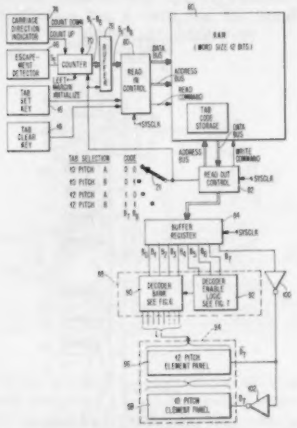
1. For use in a typewriter including means for storing, in an electronic storage unit, tab codes representing at least one set of escapement positions, a tab layout display comprising:

a scale having at least one set of markings corresponding to escapement positions;

an alignment of indicator elements, such elements being

independently signal actuable to change appearance and being positioned for association with respective escapement position markings on said scale;

means for extracting a set of tab codes from such storage;



and logic means, connected to said alignment of indicator elements, for receiving codes from said extracting means and for responsively producing signals to change the appearance of elements corresponding to such codes, whereby the layout represented by the codes is indicated.

4,169,686

QUICK RELEASE COUPLING FOR CONNECTION BETWEEN SHAFTS

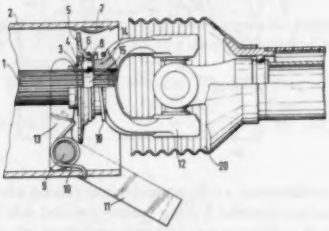
Heinrich Balensiefen, St. Augustin, and Wilhelm von Allworden, Erbach, both of Fed. Rep. of Germany, assignors to Jean Walterscheid GmbH, Lohmar, Fed. Rep. of Germany

Filed Nov. 22, 1977, Ser. No. 853,905

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1976, 2655074

Int. Cl.[2] F16D *3/32*

U.S. Cl. 403—12 **6 Claims**



1. A quick release coupling for connecting a driven cardanshaft having a universal type joint at one end thereof with a drive shaft comprising a coupling box surrounding said drive shaft, a coupling sleeve carried at the end of said driven cardanshaft having said universal joint for axially receiving therein a free end of said drive shaft, an annular groove located on said drive shaft, a ball-catch mechanism carried by said coupling sleeve having a plurality of balls arranged for snap acting cooperative engagement with said annular groove, a locking ring carried for movement on said coupling sleeve between a release position and a locking position for locking said balls in said groove for positive form fitting engagement between said drive shaft and said coupling sleeve, biasing means for urging said locking ring into said locking position, a plurality of resilient retaining straps evenly spaced about the inner circumferential wall of said coupling box, an annular release face on said locking ring having an outside diameter greater than the diameter of a circle formed by points tangent with the inside surfaces of said retaining straps, whereby said locking ring is held in said release position by said retaining straps during insertion and removal of said drive shaft with said coupling sleeve, and a release lever mounted for pivotal movement on said coupling box for engaging said release face to move said locking ring from said locking position to said release position.

4,169,687

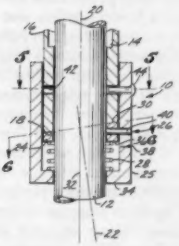
LOCK FOR EXTENDABLE LEG ASSEMBLY

George R. Schull, 6778 Eddinghill Dr., Rancho Palos Verdes, Calif. 90274

Filed Aug. 11, 1978, Ser. No. 932,947

Int. Cl.[2] F16B *7/10*

U.S. Cl. 403—109 **4 Claims**



1. A lock for an extendable leg assembly including an inner leg member coaxial with and supported for telescoping movement within an end of an outer leg member, the lock comprising:

an end face of said outer leg member around said inner leg member and inclined relative to a longitudinal axis of said inner and outer leg members such that a line normal to said end face defines an acute angle with said longitudinal axis;

a ring member having an inner diameter greater than an outer diameter of said inner leg member and supported for turning thereon, said ring including a first annular side facing said end face and inclined relative to said longitudinal axis such that in a first rotational position with a central axis of said ring coaxial with said longitudinal axis said first side is substantially parallel to and adapted to bear flush against said end face;

a turnable sleeve member axially receiving said inner leg member and surrounding said end of said outer leg member and said ring member;

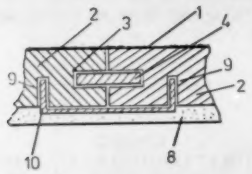
spring means within said sleeve and continuously bearing on said ring member in an axial direction toward said end face to urge said first side into flush engagement with said end face when said ring member is in said first rotational position; and

co-operative means between said sleeve and ring members for turning said ring with said sleeve between said first rotational position and a second rotational position where said first side is inclined to said end face and said ring is pivoted by said spring means to a canted position in said sleeve with said central axis forming an acute angle with said longitudinal axis and opposite radial inner annular edges of said ring engaging said inner leg member to lock said inner leg member against axial movement into said outer leg member.

4,169,688
ARTIFICIAL SKATING-RINK FLOOR

Sato Toshio, Shigasato 3-22-14, Otsu-shi, Shiga-ken, Japan

Continuation of Ser. No. 666,974, Mar. 15, 1976, abandoned.
This application Nov. 9, 1977, Ser. No. 849,942
Int. Cl.[2] E01C *5/20*
U.S. Cl. 404—40 1 Claim



1. An artificial ice skating rink floor comprising, in combination:

a floor base;

a layer of cushion material laid directly on said floor base without adhesive;

a plurality of like floor plates each having a substantially flat upper surface, a lower surface and peripheral sides, said upper surface roughened in a net-like pattern of irregularities, said irregularities having a height within the range of 0.1 to 1.0 mm and a width within the range of 0.3 mm to 1.0 mm, each of said sides forming an elongated side recess, said lower surface forming elongated bottom recesses adjacent said sides, said floor plate being formed substantially of ultra-high molecular weight polyethylene having a viscometric average molecular weight of 300,000–1,500,000, said floor plates being laid directly on said layer of cushion material without adhesive and with said side recesses along adjacent sides of adjacent floor plates being substantially in alignment with one another so as to define aligned side recesses and with said bottom recesses along adjacent sides of adjacent floor plates being substantially parallel so as to define substantially parallel bottom recesses;

elongated, generally U-shaped insertion members having substantially upright legs; and

elongated, plate-like insertion pieces;

said insertion pieces being inserted in said substantially aligned side recesses and said upright legs of said insertion members being inserted in said substantially parallel bottom recesses so that said floor plates are joined into one sheet-like structure capable of withstanding substantial temperature variation and water absorption substantially without local swells, irregularities and cracks in said ice skating rink floor.

4,169,689
TENSIONING A LONGWALL MINERAL MINING INSTALLATION

Walter Weirich, Dortmund; Michael Dettmers, Kamen; Christoph Rassmann, Lunen; Willi Heyer, Bochum-Gerthe; Herbert Beyer, Werne, and Horst Linke, Lunen, all of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany

Filed Mar. 22, 1978, Ser. No. 889,076
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1977, 2712388
Int. Cl.[2] E21D *15/44*
U.S. Cl. 405—291 29 Claims

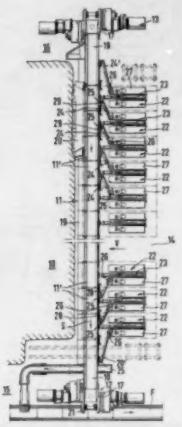
1. A mining apparatus, comprising:

(a) a longitudinally oriented longwall mineral mining installation,

(b) a longitudinally oriented roof support assembly disposed adjacent and generally parallel to said installation, said roof support assembly comprising a plurality of roof support units,

(c) means for longitudinally tensioning the installation comprising two groups of hydraulic tensioning rams, each group being disposed at a respective end zone of the installation, and

(d) a plurality of attachment joints individually mounting the ends of each hydraulic tensioning ram directly between

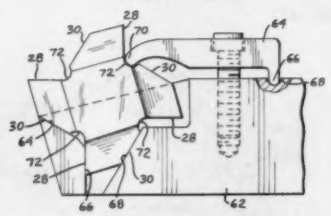


the installation and a respective roof support unit with each ram lying at an acute angle to the longitudinal axis of the installation, whereby the selected and controlled extension of the rams serves to longitudinally tension the installation.

4,169,690
CUTTING INSERT

Joseph E. Kendra, Latrobe, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Jul. 26, 1977, Ser. No. 819,370
Int. Cl.[2] B23B *27/08, 29/24;* B26D *1/00*
U.S. Cl. 407—90 1 Claim



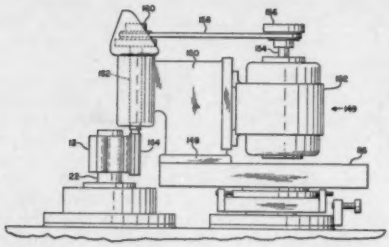
1. In combination: a cutting insert comprising a body of hard wear resistant material having spaced parallel side faces and a plurality of cutting regions on the periphery of said body in circumferentially spaced relation and facing in the circumferential direction, said insert being symmetrical about a central axis perpendicular to said side faces and having a central region bounded by said side faces, said cutting regions extending outwardly from the periphery of said central region, said cutting region having a forward surface and a rearward surface, holder means having support regions for engaging said surfaces to locate said insert in indexed positions thereof about said central axis, clamp means for clamping the insert against said support regions comprising a lever having one end formed to engage a peripheral region of said insert and the other end formed to engage a recess in said holder and a clamp screw extending through an intermediate portion of the lever and threadedly engaging said holder, and a notch formed on the periphery of said insert for engagement with said lever.

4,169,691

MACHINE FOR TRACING THE PROFILE OF AN ORBITING STAR GEAR

Henry J. Flair, Franklin Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Division of Ser. No. 793,976, May 5, 1977, Pat. No. 4,122,603.
This application Jun. 5, 1978, Ser. No. 912,647
Int. Cl.[2] B23F *5/20*; B24B *5/26*
U.S. Cl. 409—10 4 Claims



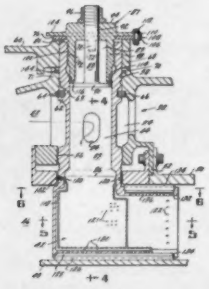
1. A machine for generating the profile of an ideal orbiting star gear which comprises a predetermined number of teeth comprising first support means for supporting a star gear blank, first rotational drive means for rotating said first support means and said star gear blank at a predetermined angular velocity, profile generating means positioned adjacent said star gear blank, second support means for supporting said profile generating means, an eccentric, second rotational drive means coupled to said eccentric for rotating said eccentric at an angular velocity that is substantially equal to the angular velocity of said star gear blank multiplied by said number of teeth, said eccentric being coupled to said second support means in a manner so that it drives said profile generating means back and forth along a line that passes through the center of said star gear blank and guide means coupled to said second support means which allows said profile generating means to also be driven by said eccentric in a direction substantially normal to said line without substantial rotation of said profile generating means occuring.

4,169,692

VARIABLE AREA TURBINE NOZZLE AND MEANS FOR SEALING SAME

Edward C. McDonough, Cincinnati, and Eugene N. Tuley, Hamilton, both of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 13, 1974, Ser. No. 532,701
Int. Cl.[2] F01D *5/18*
U.S. Cl. 415—115 11 Claims



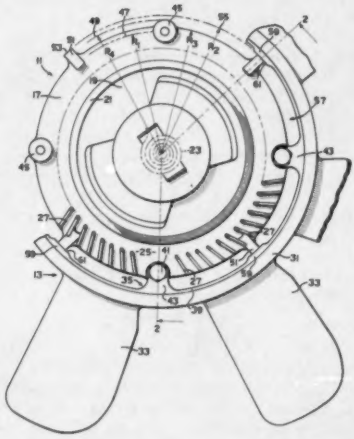
1. A vane assembly comprising:
a rigid casing having a hole therethrough;
an airfoil, one end of which transists to a generally cylindrical trunnion received within the hole, the trunnion being provided with a bore passage at an end opposite said airfoil;
lever means for adjusting airfoil pitch;
means for keying said lever means to the trunnion;
a cap retained by means of a threaded connection within the trunnion bore passage, said cap entrapping said lever means between said casing and said cap; and
retaining means for limiting the radially outward movement of said trunnion.

4,169,693

FLUID COUPLING DEVICE AND FAN MOUNTING ARRANGEMENT

Richard K. Brubaker, Warren, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed May 25, 1977, Ser. No. 800,374
Int. Cl.[2] F04D *29/34*
U.S. Cl. 416—93 R 16 Claims



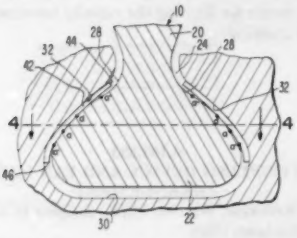
1. In the combination of a fluid coupling device and a fan assembly, the fluid coupling device including an input coupling member, an output coupling member, and means for transmitting torque between the input and output coupling members, the fan assembly including an annular hub portion, a plurality of fan blades projecting radially from the hub portion and a generally annular spider portion attached, adjacent its outer periphery, to the hub portion and, adjacent its inner periphery, to the output coupling member by fastener means, the output coupling member defining a pilot diameter and the annular spider portion defining an annular pilot surface engaging the pilot diameter, the improvement comprising:
(a) the output coupling member including a plurality N of fastener receiving means defining a fastener circle having a radius R_1 and a plurality of pilot portions providing the pilot diameter, the pilot diameter having a radius R_2, wherein R_2 is greater than R_1; the output coupling member having a radius R_3, R_2 being greater than R_3; and
(b) the annular spider portion includes a plurality N of inwardly extending fastener tabs corresponding to said plurality N of fastener receiving means, the annular pilot surface defined by the spider portion engaging the outer periphery of each of said plurality of pilot portions to minimize heat transfer from the output coupling member to the annular spider portion.

4,169,694

CERAMIC ROTOR BLADE HAVING ROOT WITH DOUBLE CURVATURE

Santiago C. Sanday, Swarthmore, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Jul. 20, 1977, Ser. No. 817,322
Int. Cl.[2] F01D *5/30*
U.S. Cl. 416—219 R **5 Claims**



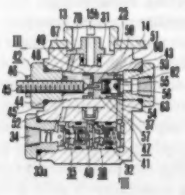
1. In a turbine: an attachment piece having an elongated groove in its outer periphery; and a pair of spaced surface portions defining at least parts of the sides of the groove, each surface portion having concave shapes in the transverse and longitudinal directions, respectively, with reference to the longitudinal axis of the groove; and a turbine blade for attachment to the attachment piece, the turbine blade having a blade section, a base coupled to the radially innermost end of the blade section, and a root coupled with the base, the root being insertable into the groove of the attachment piece, the root having a pair of side faces, each of the side faces having convex shapes in the transverse and longitudinal directions, respectively, with reference to the longitudinal axis of the groove, the curvatures of the convex shapes of the root being greater than the corresponding curvatures of the concave shapes of the adjacent surface portions of the groove, there being an initial point contact between each side face of the root and the adjacent surface portion of the groove.

4,169,695

ELECTROMAGNETIC PUMP WITH PRESSURE-REGULATING MECHANISM

Naosuke Masuda, and Sumio Yamaguchi, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Aug. 11, 1977, Ser. No. 823,599
Claims priority, application Japan, Aug. 20, 1976, 51/98758; Aug. 20, 1976, 51/110704
Int. Cl.[2] F04B *49/00*
U.S. Cl. 417—311 **5 Claims**



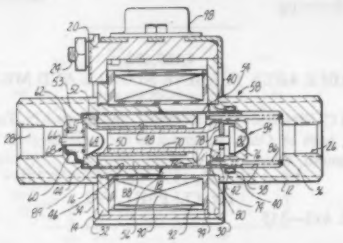
1. An electromagnetic pump comprising a pump body containing a pump chamber which has at one end a suction inlet port, a discharge port and a fluid passage connecting the other end of the pump chamber to the discharge port, a pair of reversely-positioned check valves mounted in the pump chamber with a space therebetween, a pressure chamber in communication with the space between the check valves, a ram supported with an end in the pressure chamber, said ram being reciprocable to alternately open one check valve and close the other and electromagnetic means for effecting reciprocation of the ram to alternately suck fluid in through the inlet port and discharge it through the discharge port characterized in that the valve body also contains a pressure-regulating chamber, and pressure-regulating mechanism in the pressure-regulating chamber, said pressure-regulating chamber being arranged in alignment with the discharge port and in series therewith so that the latter is concentric with one end of the pressure regulator chamber and is connected at that end to the pump chamber by way of said fluid passage, said regulating mechanism comprising a plunger in the pressure-regulating chamber which defines in conjunction with the pressure-regulating chamber a discharge chamber at one end of the plunger which is in communication with said flow passage and a relief chamber at the other end of the plunger, spring biasing means within the pressure regulator chamber yieldably holding the plunger in a position to block the discharge port, said plunger being yieldable to the pressure of the fluid, generated by the pumping action of the ram, entering the discharge chamber through the fluid passage to displace the plunger relative to the discharge port to thus permit the fluid to be discharged through the discharge port, said plunger containing an axial opening, a normally-seated spring-biased relief valve supported on the plunger in a position blocking said opening for movement with the plunger and movement relative thereto, said relief valve when open permitting flow of fluid from the discharge chamber to the relief chamber, an adjustable pressure regulator mounted in the relief chamber in axial alignment with the plunger and the relief valve in a position to displace the relief valve from said opening when the plunger is displaced a predetermined distance by the pressure of the fluid in the discharge chamber and a fluid flow passage connecting the relief chamber to the pump chamber at the inlet side of the check valves.

4,169,696

HIGH PRESSURE FLUID PUMP

Ralph V. Brown, Cayuta, N.Y., assignor to Facet Enterprises, Inc., Tulsa, Okla.

Filed Oct. 12, 1977, Ser. No. 841,517
Int. Cl.[2] F04B *17/04*
U.S. Cl. 417—417 **8 Claims**



1. A high pressure fluid pump comprising:
a housing having an inlet port, an outlet port and an internal cavity therebetween;
a pair of telescoping cylinders disposed in said cavity, one of said telescoping cylinders having one end attached to said housing and the other of said telescoping cylinders having a radial flange at the opposite end;
solenoid coil means disposed around said housing for periodically generating a magnetic field;
a magnetically permeable cylindrical armature slidably disposed about said telescoping cylinders, said armature operative to axially displace said other telescoping cylinder in response to said magnetic field;
resilient means for biasing said radial flange into contact relationship with said armature; and
valve means disposed at opposite ends of said at least telescoping cylinders, said valve means providing a unidirec-

tional fluid flow through said telescoping cylinders as said telescoping cylinders reciprocates relative to each other in response to the periodically generated magnetic field.

4,169,697

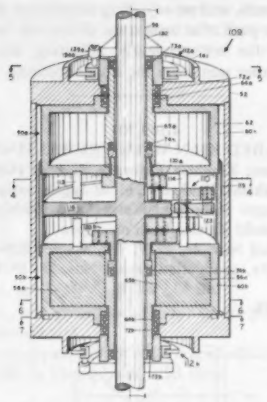
ANGULAR COMPRESSION EXPANSION CYLINDER WITH RADIAL PISTONS

George J. Doundoulakis, 2498 Kayron La., North Bellmore, N.Y. 11710

Continuation of Ser. No. 719,664, Sep. 1, 1976, abandoned, which is a continuation-in-part of Ser. No. 554,560, Mar. 3, 1975, Pat. No. 3,989,012. This application Mar. 16, 1978, Ser. No. 875,817

Int. Cl.[2] F01C *1/42*

U.S. Cl. 418—34 **4 Claims**



1. An angular cylinder for providing angular expanding and contracting chambers comprising;

a housing representing a stationary frame of reference having an imaginary axis for providing a line of reference;

a cylindrical drum symmetrically disposed around said axis having an outer cylindrical wall and two base walls;

an input/output shaft located along said axis and rigidly connected to said drum for providing an input and/or output torque;

N outer pistons integral with said drum and extending radially inwardly from said outer cylindrical wall of said drum and between said two base walls of said drum, each outer piston providing ends to two adjacent angular chambers inside said drum;

a first inner rotor telescoped around said input/output shaft for providing an inner cylindrical surface to said drum;

N inner radial pistons rigidly attached to said first inner rotor and extending radially outwardly from said first inner rotor toward said cylindrical wall and interleaved with said N outer radial pistons, each inner radial piston used for providing an azimouthal end to two adjacent angular chambers, whereby a cylindrical volume inside said drum is totally divided into 2 N angular chambers, N chambers being contracting and the other N chambers being expanding upon relative rotation of said drum and said first inner rotor;

a first abutment means for interengaging said first inner rotor and said housing thereby providing reaction between said first inner rotor and said housing at predetermined intervals of rotation of said input/output shaft;

a second inner rotor telescoped around said output shaft and angularly displaced with respect to said first inner rotor along said shaft for providing complementary action and balancing the rotational momentum of said first inner rotor;

a second abutment means for interengaging said second inner rotor and said housing for providing reaction between said second inner rotor and said housing, intermittently with said first abutment means;

differential action means for interengaging said first inner rotor, said second inner rotor and said output shaft whereby a first torque applied in a selected rotational direction to one of said inner rotors results in equal and oposite torque on the other inner rotor and a torque equal to twice the first torque into said input/output shaft;

first rotor limiting means for preventing forward rotation of said first rotor during a predetermined rotational interval of said input/output shaft;

a second rotor limiting means, intermittently operable with said first rotor limiting means for limiting the rotation of said second inner rotor during a predetermined rotational interval of said input/output shaft, whereby during one selected interval said first inner rotor moves forwardly to a predetermined rotational angle with respect to said shaft, while said shaft is displaced in a forward direction by an equal angle with respect to said second rotor;

and during a next interval said second rotor is displaced forward to a predetermined rotational angle with respect to said shaft while said shaft is being displaced forward an equal angle with respect to said first inner rotor;

intake and exhaust means for intaking a fluid into expanding chambers and expelling such fluid from contracting chambers;

and means for rotatably supporting said drum and said inner rotors on said housing.

4,169,698

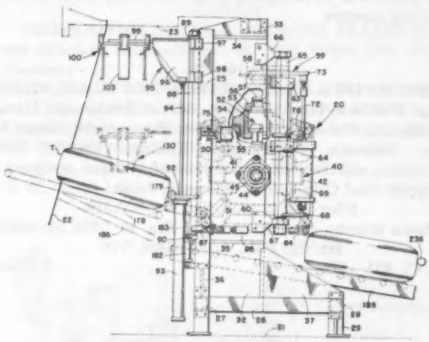
POST CURE INFLATOR

Leonard G. Turk, Aurora; Gerald J. Yuhas, Canfield, both of Ohio, and Armindo Cantarutti, Milan, Italy, assignors to NRM Corporation, Akron, Ohio

Filed Jan. 26, 1978, Ser. No. 872,489

Int. Cl.[2] B29H *5/02*

U.S. Cl. 425—28 P **24 Claims**



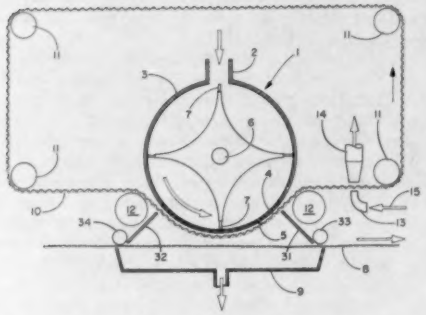
1. A post-inflation ring for inflating tires of different bead sizes comprising an essentially conical outer edge having a plurality of bead engaging steps including at least an innermost and next adjacent step, each step having a radially extending tread and an axially extending height, the tread of each step being at least slightly more than the respective height of each step whereby the angle of said conical outer edge with respect to a line normal to the axis of said ring is slightly less than 45°, and straight chamfers relieving the radially outer third of the treads of said innermost step and at least said next adjacent step, each straight chamfer having an angle with respect to a line normal to the axis of said ring of about 45° to avoid interference with the side wall of a tire thus to preclude improper seating of the tire for sealing, and each straight chamfer having a radially inner edge forming a corner with the tread of each respective step and said corner being rounded.

4,169,699

APPARATUS FOR CLASSIFYING FIBERS

Edward E. Werner, Oshkosh, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 21, 1978, Ser. No. 888,659
Int. Cl.[2] B29C *13/00*
U.S. Cl. 425—83.1 **4 Claims**



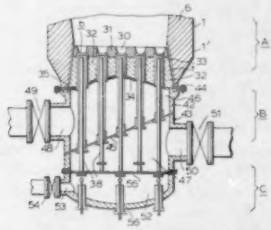
1. Sheet forming apparatus comprising a fiber receiving member on which fiber is deposited to form a sheet of the fibers, a forming head including a fiber screening member above and spaced from the fiber receiving member, an agitator supported in the forming head above the fiber screening member and operable to sift fibers through an outlet of the fiber screening member toward the fiber receiving member, and a continuous foraminous member having a run positioned structurally between the fiber receiving member and fiber screening member and operable to traverse the outlet of the fiber screening member and to receive and retain fiber clusters which may pass the fiber screening member and by movement of the foraminous member relative to the screening member to roll such clusters to an elongated shape and away from the fiber receiving member.

4,169,700

BURNER FOR A REGENERATIVE HOT BLAST STOVE

Kengo Yoshioka; Teruichi Nozato, both of Kitakyusyu; Haruki Uchiyama, Fukuoka; Akira Satoh, Shimonoseki; Shigeo Inoue, Fukuoka; Yuji Togino, Kisarazu; Keisuke Mori, Kisarazu, and Ituro Satou, Kisarazu, all of Japan, assignors to Nippon Steel Corporation, Otemachi, Japan

Filed Sep. 2, 1977, Ser. No. 830,319
Claims priority, application Japan, Sep. 10, 1976, 51/108477
Int. Cl.[2] F23C *5/00*; F24H *7/00*
U.S. Cl. 431—174 **2 Claims**



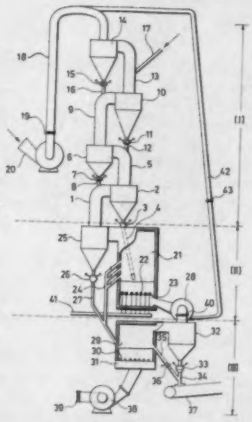
1. In a regenerative hot blast stove, the combination of a refractory furnace wall with a burner port in the bottom thereof and a shell on the outside of said wall, support means on the lower end of said shell extending inwardly from said shell, a burner structure having an upper section with a plurality of burner openings therein, and a lower section having means dividing the lower section into an upper and lower gas header and a plurality of unit burners extending from the burner openings into the lower section, each burner unit having a central flow path extending into the lower gas header and an outer flow path extending into the upper header, upper section mounting means on said upper section for removably mounting said upper section on said support means with said upper section in said burner port with the periphery of said upper section spaced a uniform distance from the portion of the furnace wall defining said burner port, and lower section mounting means removably mounting said lower section on said support means, and an adjusting mechanism at the end of the central flow path of at least some of the unit burners in the lower section for independently adjusting the flow rate through the burner unit from the lower section.

4,169,701

FLUIDIZED-BED KILN WITH PREHEATING MEANS

Toshio Katayama; Kunihisa Fujiwara, both of Hiroshima, and Yoshimine Jahami, Itsukaichi, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Yoshizawa Sekkai Kogyo Kabushiki Kaisha, both of, Japan

Filed Nov. 21, 1977, Ser. No. 853,819
Claims priority, application Japan, Nov. 29, 1976, 51-142193
Int. Cl.[2] F27B *15/00*
U.S. Cl. 432—58 **5 Claims**



1. A fluidized-bed kiln equipped with preheating means, comprising suspension-type material preheating means having one or more cyclones, a fluidized bed calciner for generating hot gases and for receiving the preheated material from said cyclone or the lowermost of said cyclones and forming a fluidized bed of said material within said calciner so that the hot gases carry the calcined material, and a collecting cyclone for collecting the hot gases carrying the calcined material, separating the same into solids and gases and having a collecting cyclone outlet, and conducting said calcined material into cooling means and said hot gases into said cyclone or the lowermost of said cyclones.

4,169,702
IMPROVED OPTICAL BRIGHTENING OF POLYAMIDES

Fritz Fleck, Bottmingen, Switzerland; Emmanuel Hervot, Bonnieres, France; Peter Merk, Muttenz, Switzerland; Horst Schmid, Reinach, Switzerland, and Achim Wiedemann, Weil-am-Rhein, Fed. Rep. of Germany, assignors to Sandoz Ltd., Basel, Switzerland

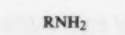
Filed Feb. 7, 1977, Ser. No. 766,410

Claims priority, application Switzerland, Feb. 10, 1976, 1610/76

Int. Cl.[2] D06P *1/645*

U.S. Cl. 8—1 W **26 Claims**

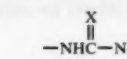
1. In a process wherein a substrate comprising fibre, filament, thread, web, fleece or woven or non-woven fabric of synthetic polyamide is impregnated with a liquor containing an optical brightener and thereafter treated with steam or with dry heat, the temperature of the steam or dry heat treatment being at least 95° C., the improvement wherein the brightener is applied in the presence of a compound or mixture of compounds of formula I,



I

wherein

R is —OH, $-NR_1R_2$ or



X being O, S or NH, and

R_1 and R_2 being, independently, hydrogen, C_{1-6}alkyl or C_{2-4}hydroxyalkyl,

which compounds are in free base or acid addition salt form or, when R is OH, in O-sulphonic acid form.

4,169,703
OXIDATIVE RED HAIR DYE

Najib M. Fakhouri, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Aug. 3, 1978, Ser. No. 930,831

Int. Cl.[2] A61K *7/13*

U.S. Cl. 8—10.2 **12 Claims**

1. A composition which, when combined with a suitable oxidizing agent, dyes keratinous fibers red, which composition is essentially free of o-, m- or p-phenylenediamine, 2,4-diaminoanisole, and nitro compounds, said composition consisting essentially of

about 0.1 to 1.5 parts by weight α-hydroxynaphthalene;

about 0.5 to 3.5 parts by weight p-aminophenol;

about 0.0 to 10.0 parts by weight of a suitable modifier;

about 0.0 to 5.0 parts by weight of a suitable coupler; and

a sufficient amount of a suitable carrier to make up a total of 100 parts by weight of said composition.

4,169,704
OXIDATIVE BLOND HAIR DYE

Najib M. Fakhouri, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Aug. 3, 1978, Ser. No. 930,830

Int. Cl.[2] A61K *7/13*

U.S. Cl. 8—10.2 **11 Claims**

1. A composition which, when combined with an oxidizing agent, dyes keratinous fibers blond, and is essentially free of o-, m- or p-phenylenediamine, 2,4-diaminoanisol, and nitro compounds, said composition consisting essentially of

about 0.01 to 1.0 parts by weight m-aminophenol;

about 0.01 to 1.0 parts by weight p-aminophenol;

about 0.1 to 1.5 parts by weight p-methylaminophenol or a suitable acid addition salt thereof;

about 0.0 to 5.0 parts by weight of a suitable modifier;

about 0.0 to 2.0 parts by weight of a suitable coupler; and

a sufficient amount of a suitable carrier to make up a total of 100 parts by weight of said composition.

4,169,705
COLORATION PROCESS

Violet Boyd; Brian R. Fishwick; Brian Glover; Stewart R. Korn, and Susan M. Bostock, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

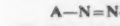
Filed Dec. 20, 1977, Ser. No. 862,428

Claims priority, application United Kingdom, Jan. 14, 1977, 1488/77

Int. Cl.[2] G09B *27/00*

U.S. Cl. 8—41 C **9 Claims**

1. A process for the continuous coloration of aromatic polyester or cellulose triacetate textile materials which comprises continuously applying to the said textile materials a disperse azo dyestuff wherein an aqueous dispersion of the disperse azo dyestuff is padded onto the textile material or a thickened printing paste is applied to the surface of the textile material, the dyestuff then being fixed on the textile material by steaming it at a temperature between 100° and 180° C. or baking it at a temperature between 160° and 220° C., the disperse azo dyestuff being free from carboxylic acid and sulphonic acid groups and being represented by the formula:



wherein A is the residue of a diazotisable aromatic amine $A—NH_2$ and E is the residue of a coupling component which is an aromatic or heterocyclic amine, an aromatic hydroxy compound, a pyrazolone or an active aliphatic methylene compound, each dyestuff containing a single carboxylic ester group and at least two cyano groups, and subsequently giving the coloured textile material a treatment in an aqueous alkaline bath which does not contain a reducing agent at a pH above 8 and at the temperature between 50° and 85° C.

4,169,706
METHOD OF CLEANING POULTRY FEATHERS

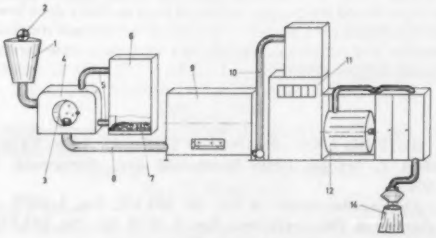
Ernst Kruchen, Bahnhofstrasse 48, 4404 Telgte, Fed. Rep. of Germany

Continuation of Ser. No. 695,474, Jun. 14, 1976, abandoned. This application Nov. 17, 1977, Ser. No. 852,301

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1975, 2532158; Mar. 25, 1976, 2612589

Int. Cl.[2] D06M *19/00;* **D06B** *9/06*

U.S. Cl. 8—94.1 R **4 Claims**



1. A method of cleaning large batches of poultry feather material without the feathers becoming substantially twisted or clotted in lumps and with the feather material retaining its bulk and tufted state, said method comprising the steps of: prior to removing dust from the feathers performing the step of washing the feather material in a washing chamber with an organic cleaning liquid consisting primarily of chlorinated hydrocarbons to provide cleaned feathers and aseptic dust, centrifugally separating said organic cleaning liquid from said feather material, blowing the feathers through a passageway from said

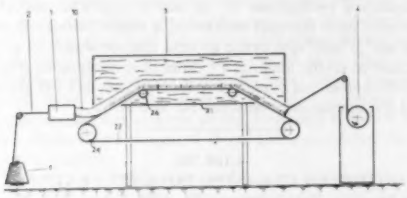
washing chamber to a separate drying compartment separated from said washing chamber, drying said feather material in said drying compartment at temperatures of up to 130° C. with the volume of said drying compartment substantially exceeding that of said washing chamber to prevent the feathers from becoming twisted during drying and to provide feathers in a high-bulk and tufted state, blowing the feathers from said drying compartment through a pipe to a separate dust removing apparatus, filtering the aseptic dust in a filter, removing aseptic dust from said cleaned feathers by blowing the feathers in said dust removing apparatus to separate aseptic dust from the feathers, discharging the cleaned and dusted feathers from said separate dust removing apparatus, and processing said centrifugally separated cleaning liquid by a distillation thereof in a distillation vessel separate from said washing chamber to remove solids and other foreign materials to prepare said cleaning liquid for reuse in said washing step, recycling said distilled cleaning liquid to said washing chamber, and recovering animal fats or greases from a distillation bottom fraction obtained by said distillation of said cleaning liquid.

4,169,707

PROCESS FOR TREATMENT OF YARN WITHIN A STEAMING CHAMBER

Alfred M. Gloeckler, Riedisheim, France, assignor to Etablissements Superba S.A., Mulhouse, France

Filed Nov. 1, 1977, Ser. No. 847,655
Claims priority, application Austria, Nov. 4, 1976, 8207/76
Int. Cl.[2] D06B *3/04*
U.S. Cl. 8—149.3 **9 Claims**



1. A process for continuous heat treatment of yarns comprising the steps of forming a continuous flexible hollow coherent cylindrical winding formed by successive annular layers of yarn turns, of depositing said cylindrical winding on a conveyor belt with said cylindrical winding being supported at least along a generatrix thereof onto said conveyor belt, and of making said conveyor belt transport said cylindrical yarn winding within a stationary hoodshaped treatment chamber having a closed top portion and an at least partially open lower portion, treatment fluid being introduced within said treatment chamber and maintained therein in a very pure state through relative density effect.

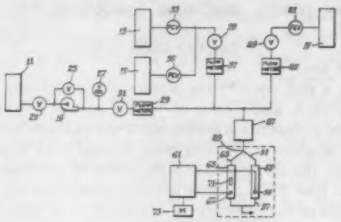
4,169,708

METHOD AND APPARATUS FOR GAS ANALYSIS

Robert Z. Muggli, 17938 Homewood Ave., Homewood, Ill. 60430

Continuation-in-part of Ser. No. 803,132, Jun. 3, 1977, abandoned. This application Apr. 5, 1978, Ser. No. 893,576
Int. Cl.[2] G01N *27/16, 27/18*
U.S. Cl. 23—232 E **11 Claims**

1. A method specific for determination of the oxygen or hydrogen level in a gas sample comprising providing a flowing stream of a gas sample containing a diluent gas selected from one of the group consisting of oxygen and hydrogn, mixing a stoichiometric excess of a gaseous fuel with said stream to provide a reactive mixture, passing said reactive mixture over a catalyst in a reaction chamber whereby said diluent gas is caused to at least partially react with said fuel to produce water and heat, limiting said heat generated by said reaction by means of a method selected from the group consisting of in situ cooling, control of said diluent gas level, partial reaction of said diluent gas and combinations of said methods to limit temperture increase in said catalyst to less than 50° C. so as to prevent reaction of gases other than said diluent gas, passing said reactive mixture over a first sensing element prior to causing said catalytic reaction, passing said reacted mixture over a second sensing element after causing said catalytic



reaction, sensing the difference caused by said catalytic reaction in a physical parameter selected from one of the group consisting of moisture and temperature, generating an electric signal by said difference sensing and comparing said electrica signal with the electric signal caused by the difference of a reference standard whereby the level of said diluent gas may be determined.

4,169,709

ARTIFICIAL FIREPLACE LOGS

Joseph F. Stima, Edison, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 592,286, Jul. 1, 1975, abandoned. This application Feb. 16, 1977, Ser. No. 770,176
Int. Cl.[2] C10L *5/00, 9/00, 10/00*
U.S. Cl. 44—10 R **11 Claims**

1. In an artificial fireplace log which burns with a visible flame and comprises, by weight, an extruded mixture of 30% to 60% of porous, fibrous, cellulose particles and about 40% to 70% of a flammable hydrocarbon which acts as the primary flame-supporting material, the improvement wherein 0.1% to 3% by weight of particles of a metallic perchlorate having a size between about 6 mesh and about 16 mesh and selected from the group consisting of cupric perchlorate, sodium perchlorate, strontium perchlorate and mixtures thereof are uniformly distributed therein, said perchlorate being effective to provide a combination of an almost immediate flame color and a crackling sound similar to that of a wood-burning fire upon ignition and until the flammable material of the log is essentially consumed.

4,169,710

PROCESS FOR COMMINUTING AND REDUCING THE SULFUR AND ASH CONTENT OF COAL

Harbo P. Jensen, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 29, 1978, Ser. No. 891,569
Int. Cl.[2] C10L *9/10;* C10B *57/00;* B02C *19/00*
U.S. Cl. 44—1 SR **7 Claims**

1. A process for comminuting raw coal, which comprises:
treating said coal with a hydrogen halide at an effective concentration level such that the coal is comminuted.

2. A process for comminuting raw coal containing sulfur and ash, which comprises:
treating said coal with a hydrogen halide in an effective concentration to produce fine coal particles substantially liberated from at least a portion of said sulfur and ash and to convert at least a portion of said sulfur and ash to solubles dissolved in said hydrogen halide; and
substantially separating the hydrogen halide and dissolved

solubles from the fine coal particles and remaining sulfur and ash.

4,169,711

METHOD FOR FORMING COAL BRIQUETTES

Timothy J. Anderson, 142 Rosewood, Fairmont, W. Va. 26554

Filed Apr. 3, 1978, Ser. No. 893,640
Int. Cl.[2] C10L *5/12, 5/40*
U.S. Cl. 44—26 7 Claims

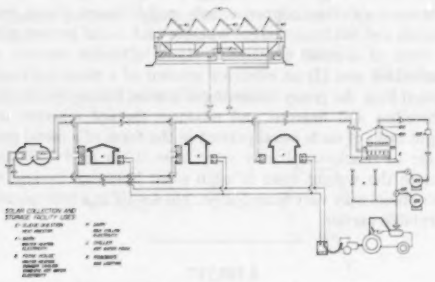
1. A method for forming coal briquettes consisting of the steps of mixing coal particles having a size range of ¼ to ¾ inch, said coal particles containing fines in the range of about 20–40% by volume, with an aqueous solution of a silicate selected from the group consisting of sodium silicate and potassium silicate, the solution of silicate comprising 2–4% by weight of the mixture thus formed, and compressing the mixture at a pressure in the range of 100–200 psi.

4,169,712

SOLAR ENERGY COLLECTION AND UTILIZATION SYSTEM

James R. Boyce, Rte. 3, Box 201, Orlando, Fla. 32811, and Erich A. Farber, 1218 NE. 5th St., Gainesville, Fla. 32601

Filed Jun. 10, 1977, Ser. No. 805,446
Int. Cl.[2] C10J *3/00;* C02C *1/14*
U.S. Cl. 48—197 A 24 Claims



1. In combination:
a reservoir;
a fluid stored in said reservoir;
a platform carried by said fluid;
a solar energy collector comprising at least one flat plate collector carried by said platform;
fluid conducting means in said solar collector for receiving energy collected from solar radiation and heating a fluid passing therethrough;
means communicating between said reservoir and said fluid conducting means whereby said fluid is heated by said collector and stored in said reservoir;
means for rotating said platform; and
means for elevating one edge of said flat plate collector.

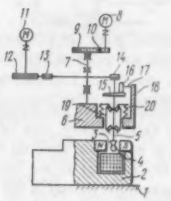
21. In combination:
a slurry tank;
heat exchange means in said tank;
a platform;
a solar energy collector comprising a parallel array of flat plate collectors carried by said platform;
means engaging the periphery of said platform for rotation about the center thereof
means for elevating one edge of each of said flat plate collectors;
a fluid conductor within each said flat plate collector for transfering heat of radiation to a fluid passing therethrough;
means coupling said fluid conductor with said heat exchange means; whereby
said heated fluid is moved from said fluid conductor through said heat exchange means to effect heating of a slurry of organic materials therein, causing generation of methane gas within said tank.

4,169,713

MACHINE FOR THREE-DIMENSIONAL POLISHING OF WORKPIECES SHAPED AS SOLIDS OF REVOLUTION IN A MAGNETIC FIELD USING FERROMAGNETIC ABRASIVE POWDERS

Viktor N. Chachin, ulitsa Kulman, 15, kv. 91; Faddei J. Sakulevich, pereulok Dalny, 3; Leonty A. Olender, ulitsa Ya. Kolasa, 67, kv. 14, all of Minsk; Grigory K. Serdyaev, ulitsa Zhukovskogo, 1, kv. 16, Udmurtskaya ASSR, Sarapul; Alexandr A. Kosobutsky, ulitsa R. Ljuxemburg, 171, kv. 5, Minsk; Oleg S. Murkov, Moskovsky prospekt, 25, kv. 42, Vitebsk, and Vitaly P. Sobolevsky, pereulok Uralsky, 13, kv. 65, Minsk, all of U.S.S.R.

Filed Apr. 11, 1978, Ser. No. 895,474
Claims priority, application U.S.S.R., Jul. 26, 1977, 2513230
Int. Cl.[2] B24B *31/00*
U.S. Cl. 51—7 2 Claims



1. A machine for three-dimensional polishing of workpieces shaped as solids of revolution in a magnetic field using ferromagnetic abrasive powder, comprising: an electromagnetic system featuring and air gap; a ferromagnetic abrasive powder accommodated in said air gap of the electromagnetic system; spindles for the workpieces being machined to hold therein; a mechanism for said spindles to traverse in order to pass the workpieces clamped therein through said air gap of the electromagnetic system; mechanisms for said spindles to rotate round their own axes; a mechanism for imparting oscillating motion to each of said spindles comprising; a cam for each of said oscillating mechanisms, said cam being held in place on the spindle; a shaped working face on said cam; an eccentric roller for each of said oscillating mechanisms, said roller being in engagement with said cam working face; a shaft whereon said roller is loosely set, said shaft being square with the axis of rotation of said spindle carrying the cam.

4,169,714

REMOVAL OF FINE PARTICLES FROM A GAS STREAM BY SOLID PARTICLE ADDITION IN VENTURI CONTACTOR

Seymour Calvert, San Diego, Calif., assignor to A.P.T., Inc., San Diego, Calif.

Filed Jan. 14, 1977, Ser. No. 759,408
Int. Cl.[2] B03C *3/00*
U.S. Cl. 55—5 21 Claims

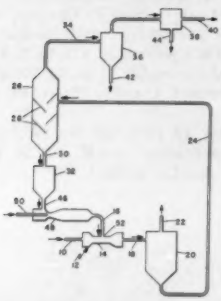
1. A process for removing finely divided solid particulate matter at high efficiency from a gas stream by interception and inertial impaction, comprising:

(a) moving a gas stream containing finely divided solid or liquid particulate matter at a velocity of between 100 and 300 feet per second in a given direction through a tubular venturi contactor;

(b) dispersing relatively larger solid collector particles into said gas stream at a negligible velocity in said given direction as said gas stream flows through said tubular venturi contactor, said collector particles being sufficiently large so as to cause said collector particles to capture said par-

ticulate matter by interception and inertial impaction and thereby form agglomerates consisting of said collector particles having said particulate matter adhered thereto, the amount of collector particles being dispersed selected such that the ratio of the flow rate of the collector particles to the flow rate of the gas is at least (0.001 gm/sec)/(cm^3/sec);

(c) maintaining the pressure drop across said tubular contactor to at least 9.3 cm water column;



wherein said velocity of the gas stream, size of the collector particles, and ratio of flow rate of collector particles to flow rate of gas is further selected from the limitations set forth in (a), (b) and (c) above such that approximately 99% of the particulate matter in the gas stream is captured by said collector particles; and

(d) removing said agglomerates from said gas stream.

4,169,715

FRACTIONATING APPARATUS

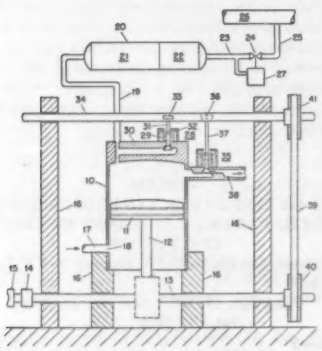
Ronny Eriksson, Täby, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Aug. 4, 1977, Ser. No. 821,909

Claims priority, application Sweden, Aug. 13, 1976, 7609060

Int. Cl.[2] **B01D** *53/04*

U.S. Cl. 55—161 **8 Claims**



1. Apparatus for fractionating a gaseous mixture having at least two components comprising:

a vessel containing a bed having an adsorbent capable of adsorbing one of said at least two components under high pressure and of desorbing said one component when the pressure is decreased;

a compressor comprising a cylinder having a reciprocatingly moveable piston mounted therein for alternately moving towards a first, compression, limit position for forcing a gaseous mixture into the bed and a second, suction, limit position for removing gas from the bed by suction, and means for admitting a gaseous mixture into said cylinder at a location between said first and second limit positions;

conduit means for conveying compressed gas from said compressor to said bed;

a collection chamber in fluid communication with said vessel for collecting gas which passes from said compressor through said bed and into said collection chamber;

outlet means comprising a controllable outlet valve for removal of gas from said collection chamber; and

controllable venting valve means in fluid communication with compressed air in the end of the cylinder adjacent said first limit position of said piston for venting gas under pressure from said collection chamber and bed through the conduit means when said piston is in said first limit position and said controllable venting valve means is opened.

4,169,716

SYNERGISTIC METAL PROTEINATE PLANT HORMONE COMPOSITIONS

Harvey H. Ashmead, 719 E. Center St., Kaysville, Utah 84037

Filed Mar. 13, 1978, Ser. No. 885,539

Int. Cl.[2] **A01N** *21/02, 9/24, 9/12, 9/22*

U.S. Cl. 71—77 **10 Claims**

1. A plant regulating composition consisting essentially of (1) an effective amount of an essential polyvalent metal selected from the group consisting of magnesium, zinc, iron, manganese, calcium, copper, cobalt, molybdenum, boron, and selenium and mixtures thereof wherein each metal present is in the form of a metal proteinate, (2) an effective amount of triacontanol and (3) an effective amount of a plant hormone selected from the group consisting of auxins, kinins, cytokinins, gibberellins and brassins and mixtures thereof wherein the weight ratio of each metal present in the form of a metal proteinate to triacontanol may vary from 0.225 to 9×10^8 and wherein the weight ratio of each plant hormone present to triacontanol may vary from 5×10^{-6} to 4×10^6 in a biologically acceptable carrier.

4,169,717

SYNERGISTIC PLANT REGULATORY COMPOSITIONS

Harvey H. Ashmead, P.O. Box 750, Clearfield, Utah 84015

Filed Oct. 20, 1977, Ser. No. 843,970

Int. Cl.[2] **A01N** *9/12, 9/00, 9/22, 9/24*

U.S. Cl. 71—89 **11 Claims**

1. A composition for plant application consisting essentially of (1) an effective amount of an essential bivalent metal selected from the group consisting of zinc, iron, magnesium, manganese, copper, molybdenum, calcium, and cobalt and mixtures thereof wherein each metal present is in the form of a metal proteinate and (2) an effective amount of a plant hormone selected from the group consisting of cytokinins, auxins and gibberellins and mixtures thereof wherein the weight ratio of each metal present to each plant hormone present may vary from 0.1125 to 9×10^7 in an aqueous carrier.

4,169,718

2-(DIMETHYLCARBAMOYLIMINO)-1,3,4-THIADIAZOLIN-3-CARBOXYLIC ACID ESTERS AND HERBICIDES CONTAINING THE SAME

Ludwig Nusslein, and Friedrich Arndt, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

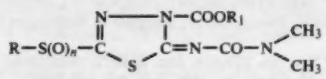
Filed May 10, 1977, Ser. No. 795,642

Claims priority, application Fed. Rep. of Germany, May 13, 1976, 2621647

Int. Cl.[2] **A01N** *9/12;* **C07D** *285/12*

U.S. Cl. 71—90 **82 Claims**

1. A 2-(dimethylcarbamoylimino)-1,3,4-thiadiazolin-3-carboxylic acid ester of the formula:



in which R is selected from the group consisting of alkyl of 1 to 6 carbon atoms, 2-alkenyl or 2-alkynyl radicals, each having up to 6 carbon atoms; R_1 is selected from the group consisting of

(a) alkyl having from 1 to 6 carbon atoms,
(b) 2-alkenyl or 2-alkinyl, each having up to 6 carbon atoms,
(c) mono and trihalogenated alkyl, 2-alkenyl or 2-alkinyl, each having up to 6 carbon atoms, and
(d) phenyl or benzyl; and

n is 0, 1, or 2.

82. A herbicide composition comprising as its active ingredient a herbicidally effective amount of at least one compound according to claim **1** and a carrier.

4,169,719

HERBICIDAL SULFONAMIDES

George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Co., Wilmington, Del.

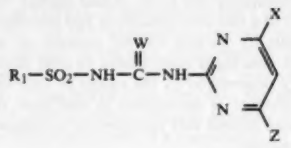
Continuation-in-part of Ser. No. 769,913, Feb. 23, 1977, abandoned, which is a continuation-in-part of Ser. No. 674,668, Apr. 7, 1976, abandoned. This application Oct. 6, 1977, Ser. No. 840,389

Claims priority, application New Zealand, Apr. 6, 1977, 183821

Int. Cl.[2] **A01N** *9/22*; **C07D** *239/32*

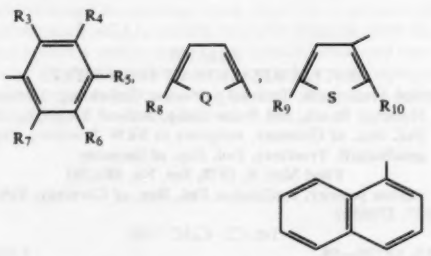
U.S. Cl. 71—92 **126 Claims**

1. A compound having the formula:



wherein

R_1 is



R_3 and R_6 are independently hydrogen, fluorine, chlorine, bromine, iodine, alkyl of 1–4 carbon atoms, alkoxy of 1–4 carbon atoms, nitro, trifluoromethyl, cyano, $CH_3S(O)_n$— or CH_3 $CH_2S(O)_n$—;

R_4 is hydrogen, fluorine, chlorine, bromine or methyl;

R_5 is hydrogen, fluorine, chlorine, bromine, methyl or methoxy;

R_7 is hydrogen, fluorine, chlorine, bromine, alkyl of 1–2 carbon atoms or alkoxy of 1–2 carbon atoms;

R_8 is hydrogen, methyl, chlorine or bromine;

R_9 and R_{10} are independently hydrogen, methyl, chlorine or bromine;

W and Q are independently oxygen or sulfur;

n is 0, 1 or 2;

X is hydrogen, chlorine, bromine, methyl, ethyl, alkoxy of 1–3 carbon atoms, trifluoromethyl, CH_3S— or CH_3OCH_2—; and Z is methyl or methoxy; or an agriculturally suitable salt thereof;

provided that:

(a) when R_5 is other than hydrogen, at least one of R_3, R_4, R_6 and R_7 is other than hydrogen and at least two of R_3, R_4, R_6 and R_7 must be hydrogen;
(b) when R_5 is hydrogen and all of R_3, R_4, R_6 and R_7 are other than hydrogen, then all of R_3, R_4, R_6 and R_7 must be either chlorine or methyl; and
(c) when R_3 and R_7 are both hydrogen at least one of R_4, R_5 or R_6 must be hydrogen.

59. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim **1**.

4,169,720

2-[4-(4-CHLOROPHENOXYMETHYL)-PHENOXY]-PROPIONIC ACID COMPOUNDS AS HERBICIDES

Erich Schacht, Seeheim; Gunter Lauterbach, Hahnlein; Werner Mehrhof, Malchen; Jurgen Curtze, Geisenheim-Johannisberg; Gerbert Linden, Ingelheim; Siegmund Lust, Darmstadt, and Klaus Thomas, Gau-Algesheim, all of Fed. Rep. of Germany, assignors to Celamerck GmbH & Co. KG, Ingelheim am Rhein, Fed. Rep. of Germany

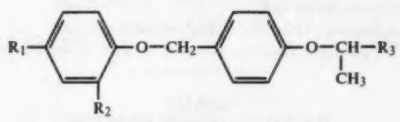
Filed Jul. 28, 1977, Ser. No. 819,823

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1976, 2635099; Aug. 4, 1976, 2635100; Jun. 30, 1977, 2729602; Jul. 11, 1977, 2731214

Int. Cl.[2] **A01N** *9/12, 9/20, 9/24*

U.S. Cl. 71—108 **2 Claims**

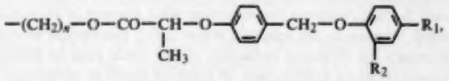
1. A method of killing weeds which comprises contacting said weeds with an effective amount of a selective herbicidal composition consisting essentially of a liquid or solid inert carrier and an herbicidally effective amount of a compound of the formula



wherein R_1 and R_2 are each hydrogen, chlorine or fluorine; and

R_3 is —COOH, —COOCat or —$COOR_6$; where Cat is one equivalent of an inorganic or organic cation; and

R_6 is alkyl of 1 to 10 carbon atoms which may optionally have a chloro, hydroxyl, lower alkoxy, lower alkoxy-lower alkoxy, lower alkylthio, amino, mono-lower alkyl-amino, di-lower alkyl-amino, allyloxy- or phenoxy-substituent attached thereto; phenyl; benzyl, monochlorobenzyl; di-chloro-benzyl; cyclohexyl; 1-ethynyl-cyclohexyl; lower alkenyl; lower alkynyl; 2-(2',4',5'-trichlorophenoxy)-ethyl; 2-(2',5'-dichloro-4'-bromo-phenoxy)-ethyl; or



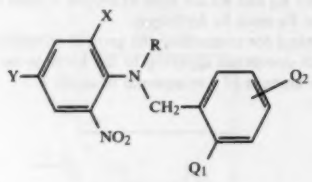
where R_1 and R_2 have the meanings defined above, and n is an integer from 2 to 6, inclusive.

4,169,721
N-(ORTHO-SUBSTITUTED BENZYL)-DINITRO-TRIFLUOROMETHYL-ANILINES AS PLANT GROWTH REGULANTS

Merrill Wilcox, Gainesville, Fla., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

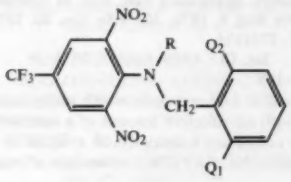
Continuation of Ser. No. 628,693, Nov. 5, 1975, abandoned, which is a continuation-in-part of Ser. No. 533,046, Dec. 16, 1974, abandoned. This application Dec. 5, 1977, Ser. No. 857,486
Int. Cl.[2] A01N *9/20*
U.S. Cl. 71—121 17 Claims

1. A compound of the formula



in which
R is hydrogen, lower alkyl or allyl,
one of X and Y is nitro and the other is trifluoromethyl,
Q_1 is halogen, lower alkyl or methoxy, and
Q_2 is hydrogen, halogen, lower alkyl or methoxy.

15. A method for controlling undesirable axillary branching of tobacco plants which comprises applying to said plants an effective amount of a compound of the formula



in which
R is lower alkyl, and
Q_1 is fluorine, chlorine, methyl or methoxy, and
Q_2 is hydrogen, fluorine, chlorine, methyl or methoxy.

4,169,722
ALUMINOTHERMIC PROCESS

George W. Fletcher, Edenvale, South Africa, assignor to Atomic Energy Board, South Africa

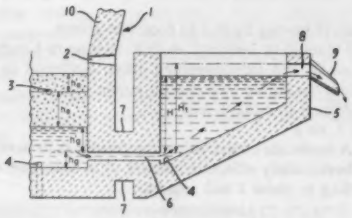
Continuation of Ser. No. 689,390, May 24, 1976, abandoned. This application Aug. 18, 1977, Ser. No. 825,827
Claims priority, application South Africa, May 28, 1975, 75/3447; May 28, 1975, 75/3448
Int. Cl.[2] C22B *4/04, 5/00*
U.S. Cl. 75—10 R 11 Claims

1. A method of conducting an aluminothermic reduction of an oxide of a reactive metal selected from the group consisting of titanium and zirconium, comprising melting in a vessel in an induction furnace a conductive aluminum containing susceptor metal, adding said oxide and aluminum to the molten mass in the vessel wherein the rate of addition of the reactants and the power input to the induction furnace are controlled for maintaining the temperature of the molten mass above the melting point thereof, wherein the minimum total amount of aluminum added relative to the reactive metal is the theoretical amount necessary for effecting reduction of the oxide plus an amount equivalent to an atomic ratio of reactive metal to aluminum of 1:1 in the case of titanium and 1:2 in the case of zirconium, and thereafter allowing the reaction mixture to cool and separating the resultant alloy product from the slag.

4,169,723
PROCESS OF MELTING BLAST-FURNACE CAST-IRON

Roberto Fernandes, Itauna, Brazil, assignor to Siderugica Italia S.A., Brazil

Continuation of Ser. No. 259,494, Jun. 5, 1972, abandoned. This application Aug. 26, 1974, Ser. No. 500,380
Int. Cl.[2] C21B *5/00*
U.S. Cl. 75—41 9 Claims



1. A process for separating molten metal from blast furnace slag comprising, flowing molten metal without slag from the hearth of a blast furnace into an external reservoir for molten metal via an enclosed passage located at a level below the upper level of the molten metal in the furnace, equilibrating the level of molten metal in said reservoir with the head pressure of the molten metal and slag above the upper level of said enclosed passage and a selected substantially constant air pressure in said blast furnace, and while simultaneously replenishing the molten metal in said reservoir by flowing thereinto metal through said passage, pouring slag-free molten metal from said reservoir through a channel opening from said reservoir at approximately the level of said molten metal in said reservoir and at a rate of replenishing and pouring determined at least in part by varying the air pressure in said furnace, whereby said pouring is controllable to pour continuously or intermittently determined by the extent of time said variation of said air pressure is maintained in said blast furnace, and cooling an area around said passageway to reduce erosion by said molten metal.

4,169,724
DESULFURIZATION OF IRON MELTS

Alfred Freissmuth, Trostberg; Werner Gmoehling, Hufschlag; Heinrich Roeck, and Peter Kniep, both of Trostberg, all of Fed. Rep. of Germany, assignors to SKW Trostberg Aktiengesellschaft, Trostberg, Fed. Rep. of Germany

Filed Mar. 8, 1978, Ser. No. 881,351
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1977, 2708522
Int. Cl.[2] C21C *7/02*
U.S. Cl. 75—58 7 Claims

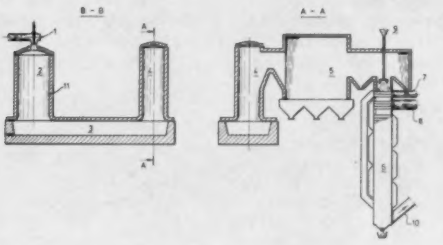
1. In a process for desulfurization or desoxidation or conjoint desulfurization and desoxidation of an iron melt at a temperature from 1200° up to 1750° C. by injecting with a gas carbidic or metallic alkaline earth containing materials or mixtures thereof, the improvement comprising introducing, into an iron melt, a carbide of an alkaline earth metal, alkaline earth metal containing material or mixtures thereof, in a finely divided form with a gas selected from the group consisting of carbon dioxide, carbon monoxide, and mixtures thereof, reacting exothermically said carbide or said alkaline earth metal material or mixtures thereof in said melt, with said gas, and substantially consuming said gas by said reaction with said carbide or alkaline earth material.

4,169,725

PROCESS FOR THE REFINING OF SULFIDIC COMPLEX AND MIXED ORES OR CONCENTRATES

Simo A. I. Makipirtti, Nakkila, Finland, assignor to Outokumpu Oy, Helsinki, Finland

Continuation of Ser. No. 682,157, Apr. 30, 1976, abandoned. This application Apr. 27, 1978, Ser. No. 900,768
Int. Cl.[2] C22B *15/00*
U.S. Cl. 75—74 7 Claims



1. A process for the suspension smelting of a raw material selected from sulfidic mixed ores and concentrates for separating impurity minerals or metals present in the raw material, comprising finely dividing the raw material and feeding the finely divided raw material along with an oxygen containing gas into a reaction zone of a furnace to form a suspension therein, directing said suspension downwards in the reaction zone, separating the impurity minerals or metals from the rest of the raw material in suspension as vapors by oxidizing the raw material in the reaction zone during a first, oxidation, stage of downward passage of the suspension through the reaction zone at a temperature of 1400°–1600° C., at a partial pressure of sulfur dioxide of 0.08 to 0.20 atmospheres and a partial pressure of oxygen of 10^{-3} to 10^{-2} atmospheres in said oxidation stage of downward passage of the suspension through the reaction zone; and bringing solid or molten impurity minerals formed in said oxidation of vaporized impurities into the gas phase by subjecting such solid or molten impurity minerals to a reducing or sulfidizing treatment or both at a temperature of 1300° C. to 1400° C. at a partial pressure of sulfur dioxide of 0.08 to 0.20 atmospheres and a partial pressure of sulfur of 10^{-4} to 2.10^{-2} atmospheres during a second stage of downward passage of the suspension through the reaction zone, the retention time of the suspension in said second stage being about 1 to 2 seconds for preventing such solid or molten impurity minerals from impinging against a molten phase in the furnace below said reaction zone by effecting said vaporization before such impingement can occur and then leading off from the furnace a gas phase bearing the vaporized impurities.

4,169,726

CASTING ALLOY AND DIRECTIONALLY SOLIDIFIED ARTICLE

Norman P. Fairbanks, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Dec. 21, 1977, Ser. No. 862,782
Int. Cl.[2] C22C *19/07*
U.S. Cl. 75—134 F 6 Claims

1. An improved casting alloy consisting essentially of, by weight, 32–34% Ni, 32–34% Co, 22–24% Cr, 2.5–3.5% Ta, 3.5–4.5% Al, 2.5–3.5% W, 0.4–0.5% C, 0.6–0.9% Si and up to 0.1% La, along with incidental impurities.

4,169,727

ALLOY OF SILICON AND GALLIUM ARSENIDE

Weldon B. Morgan, Garland, Tex., assignor to Morgan Semiconductor, Inc., Garland, Tex.

Filed May 1, 1978, Ser. No. 901,522
Int. Cl.[2] H01L *21/18*
U.S. Cl. 75—134 T 6 Claims

1. A composition of matter comprising a unitary body of single phase crystalline alloy of silicon and gallium arsenide.

4,169,728

CORROSION RESISTANT BRIGHT ALUMINUM ALLOY FOR DIE-CASTING

Yo Takeuchi; Shinichi Komori; Kazuo Toda, all of Urawa, and Yasumasa Miyashita, Ohi, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Ohtemachi and Shinkoriko Co., Ltd., Kawagoe, both of, Japan

Filed Feb. 9, 1978, Ser. No. 876,275
Int. Cl.[2] C22C *21/08*
U.S. Cl. 75—141 2 Claims

1. A corrosion resistant bright aluminum alloy for die-casting consisting essentially of, in weight percentage:

Zinc	from 0.5	to 2.5%,
Magnesium	from 1.1	to 3.0%,
Silicon	from 0.3	to 1.2%,
Iron	from 0.2	to 1.5%,
Manganese	from 0.3	to 1.2%,
Copper	from 0.1	to 0.3%, and

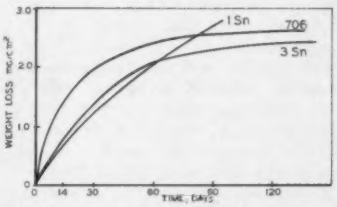
the balance aluminum and incidental impurities.

4,169,729

CORROSION RESISTANT COPPER BASE ALLOYS FOR HEAT EXCHANGER TUBE

James M. Popplewell, Guilford; Constance F. Acton, Wallingford, and Andrew J. Brock, Cheshire, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Feb. 21, 1978, Ser. No. 879,135
Int. Cl.[2] C22C *9/02*
U.S. Cl. 75—154 5 Claims



1. A corrosion resistant single phase alloy which is particularly useful in tubing applications, said alloy being free of aluminum, said alloy having an improved steady state corrosion rate, said alloy consisting essentially of 3.0 to 7.5% by weight nickel, 0.5 to 4.0% by weight tin and 0.001 to 1.0% by weight manganese, balance copper.

4. A corrosion resistant single phase alloy which is particularly useful in tubing applications, wherein the elements present in said alloy consist essentially of 3.0 to 7.5% by weight nickel, 0.5 to 4% by weight tin, up to 4% by weight aluminum, 0.001 to 1.0% by weight manganese, and 0.01 to 2.0% by weight of an element selected from the group consisting of arsenic and antimony or combinations thereof, the balance copper.

4,169,730

COMPOSITION FOR ATOMIZED ALLOY BRONZE POWDERS

Paul E. Matthews, Lawrenceville, and Kenneth C. Ramsey, Pottersville, both of N.J., assignors to United States Bronze Powders, Inc., Flemington, N.J.

Filed Jan. 24, 1978, Ser. No. 871,967
Int. Cl.[2] C22C 9/00, 9/02
U.S. Cl. 75—157 5 Claims

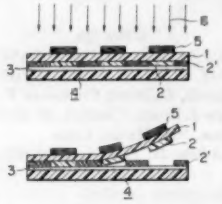
1. A prealloyed atomized metal powder having high green strength in the as atomized form wherein the nominal percentage of copper is 89 percent, the nominal percentage of tin is 9 percent, and the nominal percentage of zinc is 2 percent.

4,169,731

METHOD FOR THE PREPARATION OF A PLANOGRAPHIC PRINTING PLATE

Atsumi Noshiro, Chiba; Hiroyuki Obata, Chofu; Minoru Takamizawa, and Yoshio Inoue, both of Annaka, all of Japan, assignors to Dai Nippon Printing Co. Ltd and Shin-Etsu Chemical Co. Ltd., both of Tokyo, Japan

Filed Jan. 11, 1978, Ser. No. 868,620
Claims priority, application Japan, Mar. 29, 1977, 52-33956
Int. Cl.[2] G03C 11/12, 7/02
U.S. Cl. 96—1 R 9 Claims



1. A method for the preparation of a dry planographic printing plate comprising the steps of

(a) coating one surface of a substrate which is transparent to ultraviolet light with an uncured photocurable silicone,

(b) bringing the surface of the substrate thus coated into direct contact with a surface of a base plate which has been treated with a primer selected from the group consisting of vinyl tris(2-methoxyethyoxy) silane, 3-(glycidoxypropyl trimethoxy silane, N-(trimethoxysilylpropyl) ethylenediamine, 3-methacryloxypropyl trimethoxy silane, 3-aminopropyltriethoxy silane, mixtures thereof, and partial (co)hydrolyzates thereof, to form a laminate,

(c) producing an image pattern made of a material which is opaque to the ultraviolet light on the other surface of the substrate electrophotographically or manually by applying an ultraviolet opaque ink directly on said other surface,

(d) irradiating the laminate with ultraviolet light from the side of the image pattern, and

(e) separating the substrate from the base plate to allow a portion of the photocured silicone coating to transfer to the surface of the base plate, and a portion of the uncured silicone coating to stay in situ on the surface of the substrate.

4,169,732

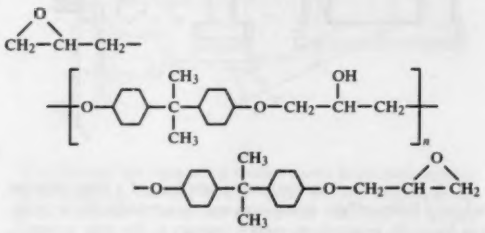
PHOTOSENSITIVE COATING COMPOSITION AND USE THEREOF

John F. Shipley, Endicott, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

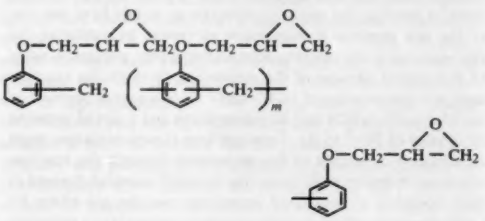
Filed Jan. 9, 1978, Ser. No. 867,996
Int. Cl.[2] G03C 5/16; B05D 3/06; B32B 27/38
U.S. Cl. 96—35.1 29 Claims

1. A photo-processable patternable coating composition consisting essentially of:

(a) reaction product of monoethylenically unsaturated carboxylic acid and a bisphenol A-diglycidyl ether epoxide of the formula:



(b) reaction product of monoethylenically unsaturated carboxylic acid and an epoxidized novolac of the formula:



(c) the ratio of a:b is from about 1:4 to about 4:1;

(d) polyethylenically unsaturated compound;

(e) photo-initiator; and

(f) wherein the relative amount of said acid to each of said epoxides is sufficient to react stoichiometrically with about 20 to about 100 percent of the epoxide functionality of said epoxides.

4,169,733

PROCESS FOR FORMING HIGH-CONTRAST SILVER IMAGES

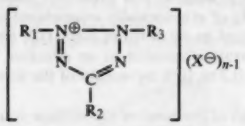
Tateshi Iytaka; Syunji Matsuo; Toshio Nagatani; Kazuo Takahashi, and Takeshi Habu, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1978, Ser. No. 871,348
Claims priority, application Japan, Feb. 1, 1977, 52-9918
Int. Cl.[2] G03C 5/26, 5/30, 1/06
U.S. Cl. 96—50 PT 13 Claims

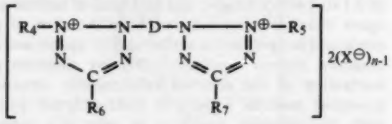
1. A process for forming a high contrast silver image which comprises treating a light-sensitive silver halide photographic material provided with a hydrophilic colloidal layer including a silver halide emulsion layer, coated on a support and containing at least one tetrazolium compound selected from the group consisting of those having the following general formula I, II and III, and a compound comprising said tetrazolium compound and an anionic surfactant, after imagewise exposure, with at least one liquid selected from the group consisting of a developer, and a processing solution prior to the developing, which liquid contains at least a nitrogen-containing heterocy-

clic compound selected from the group consisting of those having the following general formula IV or V

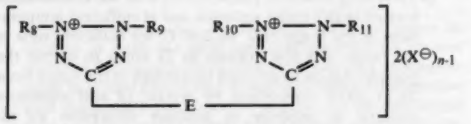
general formula I :



general formula II :

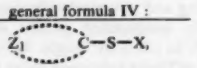


general formula III :

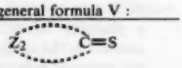


where R_1, R_3, R_4, R_5, R_8, R_9, R_{10} and R_{11} individually represent groups selected from alkyl, allyl, phenyl, naphthyl and heterocyclic groups, which groups may form a metal chelate or complex; R_2, R_6 and R_7 individually represent groups selected from allyl, phenyl, napthyl, heterocyclic, alkyl, hydroxyl, carboxyl or a salt thereof, carboxyalkyl, amino, mercapto and nitro, hydrogen; D is a divalent arylene group; E represents a group selected from alkylene, arylene and aralkylene groups; $X^{\ominus}$ is an anion; and n is 1 or 2, provided that when the compound forms an intramolecular salt, n is 1,

general formula IV :



general formula V :



wherein, Z_1 and Z_2 each represent an atom or an atomic group which forms a heterocyclic ring selected from the group consisting of imidazoline-, imidazole-, imidazolone-, pyrazoline-, pyrazole-, pyrazolone-, oxazoline-, oxazole-, oxazolone-, thiazoline-, thiazole-, thiazolone-, selenazoline-, selenazole-, selenazolone-, oxadiazole-, thiadiazole-, triazole-, benzimidazole-, benzotriazole-, indazole-, benzoxazole-, benzothiazole-, benzoselenazole-, pyrazine-, pyrimidine-, pyridazine-, triazine-, oxazine-, thiazine-, tetrazine-, quinazoline-, phthalazine- and polyazaindene rings.

4,169,734

CHEMICALLY BONDED MAGNESIA-CHROME REFRACTORIES

Bohus Brezny, Middletown, Ohio, assignor to Armco Steel Corporation, Cincinnati, Ohio

Filed Feb. 21, 1978, Ser. No. 879,438
Int. Cl.[2] C04B *35/04, 35/42*
U.S. Cl. 106—59 **24 Claims**

1. A chemically bonded magnesia-chrome refractory especially suited for use, in the unfired state, in the construction of steel making furnaces wherein high operating temperatures such as in the range of 2800° F. to 3100° F. may be encountered, such refractory being comprised of refractory brickmaking size graded magnesia and chrome ore grain in a weight ratio between 90/10 and 30/70, the major portion of the chrome ore grains being of a size between 24 and +200 mesh screen; and a chemical binder; said refractory having a silica content of 0.5% to 2.5% by weight on the basis of an oxide analysis of the whole refractory mixture; and the refractory containing lime (CaO) in a lime/silica ratio (CaO/SiO_2) in the range of 0.2 to 2.5; said refractory being further characterized by a relationship between the said silica content and the said lime/silica ratio such that when the silica content is on the high side (1.4% to 2.5%), then the said lime/silica ratio must be on the low side (0.2 to 1.0), and when the said silica content is on the low side (0.5% to 1.3%), then the lime/silica ratio may be 0.2 to 2.5; and said refractory being further characterized by a relationship among the silica content, lime/silica ratio and chemical binder such that when the silica content is on the high side (1.4% to 2.5%) and therefore the lime/silica ratio is on the low side (0.2 to 1.0), then the chemical binder should be free of calcium; and such that when the silica content is on the low side (0.5% to 1.3%) and the lime/silica ratio is also on the low side (0.2 to 1.0), then the chemical binder should again be free of calcium; but such that when the silica content is again on the low side (0.5% to 1.3%) but with the lime/silica ratio being on the high side (1.8 to 2.5), then the chemical binder may contain calcium; said refractory having, in its unfired state, improved strength, slag resistance and volume stability in long time, high temperature applications such as in the construction of steel making furnaces.

4,169,735

CURABLE COMPOSITIONS COMPRISING AQUEOUS SOLUTIONS OF WATER-SOLUBLE SILICATES AND WATER-SOLUBLE BORATE LATENT INSOLUBILIZERS

William G. Boberski, Gibsonia; Jerome A. Seiner, Pittsburgh, and John E. Blasko, Gibsonia, all of Pa., assignors to PPG Industries, Inc., PA

Continuation-in-part of Ser. No. 740,984, Nov. 11, 1976, abandoned. This application Jan. 10, 1978, Ser. No. 868,567
Int. Cl.[2] C09D *1/02*
U.S. Cl. 106—84 **12 Claims**

1. A curable composition comprising an aqueous solution of a water-soluble silicate and a water-soluble latent insolubilizer selected from the group consisting of alkali metal borates and quaternary ammonium borates, having dispersed therein an inorganic pigment selected from the group consisting of titanium dioxide, zirconium dioxide, alumina and tin oxide in an amount which provides an at least about 2.5 percent pigment volume concentration, and wherein the amount of said insolubilizer included in the composition is sufficient to enhance the wet abrasion resistance of the cured coating, but insufficient to cause rapid package instability in the uncured state.

4,169,736

ADDITIVE FOR GROUTS, ITS PREPARATION AND USE

Hilmer R. Nielsen, Krögarvägen 16, Norsborg, Sweden (145 52)

Filed Dec. 19, 1977, Ser. No. 862,099
Claims priority, application Sweden, Jan. 5, 1977, 7700110
Int. Cl.[2] C04B *7/353*
U.S. Cl. 106—93 **16 Claims**

1. An additive for improving the hardening characteristics of inorganic hydraulic binder compositions, comprising an alkali extract of a lignocellulosic material modified with a fatty acid or a fatty acid oily ester which is in a liquid state at or slightly above room temperature.

4,169,737

INTRACHROMOSPHERULOID/INTRALEUCOSPHERULOID PIGMENT COMPOSITIONS AND PROCESSES FOR PRODUCING SAME

Oliver W. Burke, Jr., deceased, late of Fort Lauderdale, Fla. (by Norma Scala, administratrix), and Victor T. Humphreys, Pompano Beach, Fla., assignors to Marion Darrah and Joseph Y. Houghton, Co-Trustees, c/o Burke Research Company, Pompano Beach, Fla.

Filed Aug. 6, 1976, Ser. No. 712,252
Int. Cl.[2] C08K *9/02, 9/04, 9/10*
U.S. Cl. 106—308 M **61 Claims**

1. A process for producing intrachromospheruloid/intraleucospheruloid pigment composition, which process comprises, in combination:

(I) preparing an intrachromospheruloid pigment composition by

(a) providing in liquid medium a particulate organic pigment composition consisting essentially of organic color pigment composition dispersed in said medium with the aid of 0–100% by weight of the total of surface active agent material set forth in (c), said organic color pigment composition being essentially insoluble in the liquid and having primary particles of an average size less than 0.2 micron in diameter,

(b) forming an aqueous emulsion polymerization system consisting essentially of (1) the composition of (a), (2) the balance, if any, of 100% of the total of surface active agent material set forth in (c) and (3) monomer material selected in the ratio of said monomer material to said pigment composition lying in the range of 100:1 to 1:20 by weight, said monomer material consisting essentially of monomer material selected as set forth in step (III) and (4) emulsion polymerization initiator in an effective amount in the range of 0.2 to 10% by weight of the said monomer material,

(c) the ratio of the total of the surface active agent material present after (b) to said particulate pigment composition and monomer material lying in the range of 2:1 to 1:40 by weight, and said total of surface active agent material being selected from the class of polymeric and nonpolymeric surface active agent and combinations thereof capable of effecting emulsion polymerization of the selected ethylenically unsaturated monomer material to yield polymer particles with the pigment provided in step (a) imbedded therein,

(d) effecting emulsion polymerization of the combination formed in (b) under agitation and at sufficient temperatures in the range of 0° to 200° C. for sufficient time in the range of a few minutes to 24 hours to permit the polymerization to proceed far enough to effect from 50 to 100% conversion by weight of said monomer material to produce in aqueous dispersion an intrachromospheruloid pigment consisting essentially of spheruloids of organic polymer material cross-linked to insolubility in any physical solvent, having primary particles of an average size not exceeding 4 microns in diameter, and having imbedded therein the still smaller size particles of said particulate organic color pigment composition.

(II) preparing an intraleucospheruloid pigment composition by

(a′) providing in liquid medium a particulate pigment composition consisting essentially of inorganic pigment composition dispersed in said liquid medium with 0–100% by weight of the total of surface active agent material set forth in (c′), said inorganic pigment composition being made up of one or more members selected from the class consisting of the opaque white pigments and the transparent white pigments having refractive indicies different from that of the cross-linked organic polymer formed in step (d′) and said inorganic pigment composition having primary particles of an average size less than 0.2 micron in diameter;

(b′) forming an aqueous emulsion polymerization system consisting essentially of (1) the composition of (a′), (2) the balance, if any, of 100% of the total of surface active agent material set forth in (c′) and (3) monomer material selected in the ratio of said monomer material to said pigment composition in (a′) lying in the range of 100:1 to 1:20 by weight, said monomer material consisting essentially of ethylenically unsaturated monomer material selected as set forth in step (III), and (4) emulsion polymerization initiator in an effective amount in the range of 0.2 to 10% by weight of the monomer material present,

(c′) the ratio of the total of the surface active agent material present after (b′) to the particulate pigment composition and monomer material present lying in the range of 2:1 to 1:40 by weight, and said total of surface active agent material being selected from the class of polymeric and nonpolymeric surface active agents and combinations thereof capable of effecting emulsion polymerization of the selected ethylenically unsaturated monomer material present to yield polymer particles with the pigment provided in step (a′) imbedded therein,

(d′) effecting emulsion polymerization of the combination formed in (b′) under agitation and at sufficient temperatures in the range of 0° to 200° C. for sufficient time in the range of a few minutes to 24 hours to permit the polymerization to proceed far enough in the range from 50 to 100% conversion by weight of said monomer material to produce in aqueous dispersion an intraleucospheruloid pigment composition consisting essentially of spheruloids of organic polymer material cross-linked to insolubility in any physical solvent, having primary particles of an average size not exceeding 4 microns in diameter, and having imbedded therein the still smaller size particles of said inorganic pigment composition,

(III) the monomer material referred to in steps (I) (b) and (II) (b′) and (IV) (a″), being selected from the class consisting of group (i) monomer material containing and polymerizable through a single ethylenically unsaturated group in the amount of 0% to 99.8% by weight and group (ii) monomer material containing and polymerizable through a plurality of ethylenically unsaturated groups in an amount in the range of 0.2% to 100% by weight for forming polymer spheruloids of different refractive index from the pigment particles,

(IV) forming an intrachromospheruloid/intraleucospheruloid pigment composition by:

(a″) forming a combination, in a weight ratio in the range of 1:100 to 100:1, dry basis, of aqueous dispersions formed in steps (d) and (d′), and bonding in said combination the spheruloids formed in step (d) to spheruloids formed in step (d′); and

(b″) recovering said intrachromospheruloid/intraleucospheruloid pigment composition from the combination formed in step (a″).

4,169,738

DOUBLE-SIDED SOLAR CELL WITH SELF-REFRIGERATING CONCENTRATOR

Antonio Luque, Leneros 29, 1° B, Madrid 20, Spain

Filed Nov. 21, 1977, Ser. No. 853,483
Claims priority, application Spain, Nov. 24, 1976, 453.575; Feb. 4, 1977, 455.632; May 5, 1977, 458.514
Int. Cl.[2] H01L *31/06*
U.S. Cl. 136—89 PC **5 Claims**

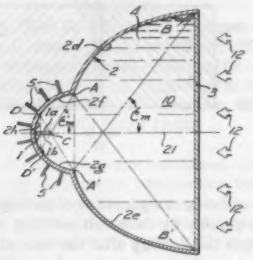
1. An apparatus for directly converting solar energy to electrical energy comprising:

a planar, single wafer of semiconductor material of a first conductivity type, said wafer having two doped sides to form two p-n semiconductor junction layers immediately adjacent and parallel to said doped sides, both of said doped sides being photovoltaically active;

a solar concentrator for simultaneous high concentration

illumination of both of said sides with concentrated sunlight, said wafer being fixed relative to said concentrator and oriented to simultaneously receive concentrated sunlight on both of said sides; and

conductive grid means fixed to and extending over both of said sides and electrically connected to said wafer to serve as anode and cathode means, said grid means permitting



substantial illumination of said sides, said grid means including at least one grid electrically connected to said wafer of first conductivity type via a plurality of window areas in at least one of said doped sides and at least another grid electrically connected to at least one of said doped sides, said p-n junction layer adjacent said windowed area side being discontinuous due to said interposed window areas.

4,169,739

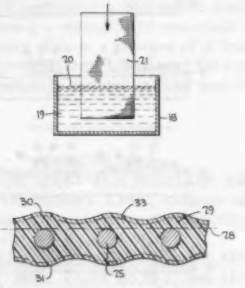
METHOD OF MAKING SILICON-IMPREGNATED FORAMINOUS SHEET BY PARTIAL IMMERSION AND CAPILLARY ACTION

Joseph Lindmayer, Bethesda, Md., assignor to Semix, Incorporated, Rockville, Md.

Filed Apr. 12, 1978, Ser. No. 895,814

Int. Cl.[2] H01L *21/208, 21/84, 27/14*

U.S. Cl. 148—1.5 **8 Claims**



1. A method of forming a silicon body suitable for use in making photovoltaic devices, comprising

(a) contacting a bath of molten silicon with a foraminous carrier of material that is capable of maintaining its structural integrity in the presence of molten silicon, said contacting comprising the step of partially immersing said carrier in said bath, so as to allow at least a portion of one surface of said carrier to be coated with silicon by capillary action of said molten silicon,

(b) maintaining said carrier in contact with said bath until foramina of said carrier have been filled with silicon and said portion of one surface of said carrier has been coated with silicon,

(c) removing said carrier from contact with said bath, and

(d) cooling said carrier and said molten silicon to form a silicon body having a surface zone of silicon and an inner zone comprised of silicon and said carrier, said surface zone being substantially free of said carrier and having a depth of at least about ten microns.

4,169,740

METHOD OF DOPING A BODY OF AMORPHOUS SEMICONDUCTOR MATERIAL BY ION IMPLANTATION

Siegfried Kalbitzer; Gerhard Müller, both of Heidelberg, Fed. Rep. of Germany; Walter E. Spear, and Peter G. Le Comber, both of Dundee, Scotland, assignors to Max-Planck-Gesellschaft zur Forderung der Wissenschafter e.V., Gottingen, Fed. Rep. of Germany

Filed Jun. 16, 1978, Ser. No. 916,065

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1977, 2756861

Int. Cl.[2] H01L *21/263, 45/00*

U.S. Cl. 148—1.5 **12 Claims**

1. Method of doping a body of amorphous semiconductor material by ion implantation comprising the steps of

providing a body of amorphous semiconductor material;

and bombarding said body by accelerated ions of a predetermined doping material and

wherein, in accordance with the invention, while the bombarding step is carried out the method includes the step of heating said body to a temperature which is above a temperature of about 20° C. and below the recrystallization temperature of the body of amorphous semiconductor material.

4,169,741

METHOD FOR THE SURFACE TREATMENT OF METALS

Karl Lampatzer, and Werner Rausch, both of Oberursel, Fed. Rep. of Germany, assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Mar. 9, 1978, Ser. No. 884,871

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1977, 2711431

Int. Cl.[2] C23F *7/26*

U.S. Cl. 148—6.16 **7 Claims**

1. A hexavalent chromium-free process for treating a metal surface to prepare the surface for the application of lacquers, adhesives and other synthetic or resinous materials comprising contacting the surface with an aqueous acidic composition consisting essentially of trivalent chromium, phosphate and dispersed silicic acid wherein the molar ratio of Cr-III:PO_4:-SiO_2 equivalent is 1:0.3–30:0.5–10 in an amount sufficient to yield a dry film weight of up to 0.6 g/m^2 of metal surface and thereafter drying the film without rinsing the surface.

4,169,742

CAST NICKEL-BASE ALLOY ARTICLE

Carl S. Wukusick, Cincinnati; Thomas Tom, West Chester, and Leo Buchakjian, Jr., Fairfield, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

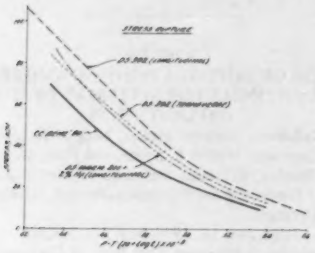
Continuation-in-part of Ser. No. 751,317, Dec. 16, 1976, abandoned. This application Oct. 17, 1977, Ser. No. 842,698

Int. Cl.[2] C22C *19/05*

U.S. Cl. 148—32.5 **6 Claims**

1. An improved cast nickel-base alloy article having a complex internal passage, a columnar grain structure and improved castability and stress rupture properties as a result of its being made from an alloy consisting essentially of, by weight, 3–10% Cr, 10–13% Co, 5–6% Al, 5–7% Ta, up to about 2% Ti, up to about 2.5% V, about 0.5–10% Re, about 3–7% W, 0.5–2% Mo, about 0.5–2% Hf, about 0.01–0.15% C, about 0.005–0.05% B, up to about 0.1% Zr, up to about 1% Cb with the balance

essentially Ni and incidental impurities, the alloy further characterized by the Co being about 11–13% when the Al is greater



than about 5.5% or when the W is at least about 5%, and including about 64–68 vol. % gamma prime phase.

4,169,743

ZIRCONIUM-BASE ALLOY NUCLEAR FUEL CONTAINER AND METHOD

Daeyong Lee, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 535,271, Dec. 23, 1974, abandoned.
This application Nov. 25, 1977, Ser. No. 854,974
Int. Cl.[2] C22C *1/18*
U.S. Cl. 148—32 **2 Claims**

1. A fast neutron-irradiated zirconium-base alloy body selected from the group consisting of Zircaloy-2 and Zircaloy-4 containing from 0.05 to 0.25 weight percent beryllium and having substantially greater load-carrying capacity than similar conventional zirconium-base alloy bodies irradiated in the same way and to the same degree, and having at 327° C. an unique combination of physical properties including 2.5 percent uniform elongation, 8.2 percent total elongation and 35 percent area reduction, yield strength greater than 76,000 psi, and tensile strength greater than 80,000 psi.

4,169,744

NICKEL-CHROMIUM-SILICON ALLOY BRAZING FOIL

Thomas L. D'Silva, Belmont, Calif., assignor to Western Gold and Platinum Company, Belmont, Calif.

Filed Jun. 28, 1978, Ser. No. 920,095
Int. Cl.[2] C22C *19/05*
U.S. Cl. 148—32 **5 Claims**

1. A thin ductile brazing sheet consisting essentially of an alloy consisting essentially of from about 45 to about 78 atomic percent of nickel, from about 16 to about 34 atomic percent of chromium and from about 6 to about 21 atomic percent of silicon, said sheet having a thickness of from about 0.0005 to about 0.005 inches and said composition containing a sufficient amount of an amorphous phase and a metastable, solid solution, microcrystalline phase to render said alloy ductile.

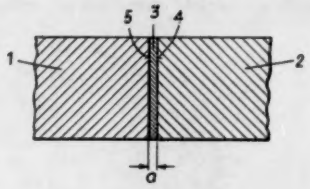
4,169,745

METHOD OF JOINING FROGS OF WEAR-RESISTING MANGANESE STEEL CASTINGS TO RAILS OF CARBON STEEL

Alfred Moser, and Hubert J. Augustin, both of Leoben, Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Vienna, Austria

Filed Aug. 9, 1978, Ser. No. 932,214
Claims priority, application Austria, Aug. 19, 1977, 6030/77
Int. Cl.[2] C21D *1/00*
U.S. Cl. 148—127 **6 Claims**

1. A method of joining frogs consisting of wear-resisting austenitic manganese steel casting to rails of carbon steel by welding and with the aid of an interposed connector consisting of austenitic low-carbon steel, characterized in that the connector is first welded to the regular rail or interconnecting rail, particularly by flash-butt welding, and thereafter is cooled, that the length of the connector which has been welded to the regular rail is limited to 20 to 25 mm, at most, preferably to 15 to 20 mm, that in a second welding operation the frog consist-



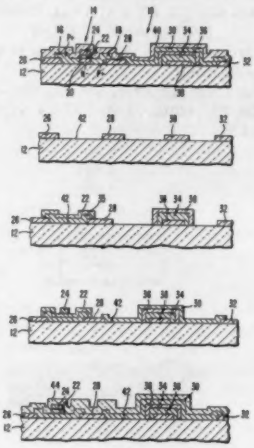
ing of a wear-resisting manganese steel casting is welded to the connector, preferably by flash-butt welding, and is thereafter cooled, and that the cooling after the second welding operation is effected at a higher rate than the cooling after the first welding operation.

4,169,746

METHOD FOR MAKING SILICON ON SAPPHIRE TRANSISTOR UTILIZING PREDEPOSITION OF LEADS

Alfred C. Ipri, and Joseph H. Scott, Jr., both of Princeton, N.J., assignors to RCA Corp., New York, N.Y.

Division of Ser. No. 791,945, Apr. 28, 1977, Pat. No. 4,119,992.
This application Aug. 2, 1978, Ser. No. 930,381
Int. Cl.[2] H01L *21/86, 21/88, 29/72*
U.S. Cl. 148—175 **5 Claims**



1. A method of making an integrated circuit structure comprising:

(a) selecting an insulating body upon which a single crystal semiconductor device may be epitaxially deposited;

(b) forming a series of conductors on a surface of said body;

(c) epitaxially depositing semiconductor material on the exposed portions of said body and over said conductors;

(d) defining said semiconductor material into transistors overlying said body and into first conductive regions overlying said conductors;

(e) forming insulating layers over said transistors and first conductive regions;

(f) forming second conductive gate regions over said insulating layers overlying said transistors while simultaneously forming conductive crossovers overlying said insulating layers which overlie said first conductive region; and

(g) adding impurities to said transistors in order to form a source and drain in the area of said transistors which do not overlie said gate regions.

4,169,747

COMPOSITION FOR ACCELERATING THE SETTING OF CALCINED GYPSUM AND THE PRODUCT FORMED THEREBY

Felix J. De Rooy; Thell D. Daniel; Erle C. Annes, all of Plaster City, and Billy G. Arnold, El Centro, all of Calif., assignors to United States Gypsum Company, Chicago, Ill.

Division of Ser. No. 624,367, Oct. 21, 1975, Pat. No. 4,059,456. This application Jun. 6, 1977, Ser. No. 803,503

Int. Cl.[2] B32B *13/00*

U.S. Cl. 156—39 **12 Claims**

1. A method of making gypsum wallboard, comprising

(a) forming a dry accelerator composition by grinding together calcium sulfate dihydrate and a lignosulfonate to fine particle size, said lignosulfonate being present in an amount from about 0.5% to about 99% by weight of said composition,

(b) mixing a minor proportion of said acclerator composition and a major proportion of calcium sulfate hemihydrate with water to form an aqueous slurry,

(c) depositing said slurry on a surface and permitting said slurry to set, and drying the gypsum wallboard formed thereby.

4,169,748

POST-PRESS EMBOSSING OF A CONSOLIDATED MAN-MADE BOARD

John T. Clarke, St. Charles; Royce K. Harker, Lombard, both of Ill.; Michael E. Hittmeier, Longview, Wash., and James W. Eaton, Elgin, Ill., assignors to Masonite Corporation, Chicago, Ill.

Filed Feb. 1, 1978, Ser. No. 874,218

The portion of the term of this patent subsequent to Feb. 8, 1994, has been disclaimed.

Int. Cl.[2] B29J *5/04;* **B31F** *1/00*

U.S. Cl. 156—62.2 **14 Claims**

1. A method of embossing a decorative man-made board comprising embossing a consolidated man-made board with a contoured embossing plate at a pressure of at least about 1000 psi, at a temperature of at least 400° F. and for a period of time sufficient to permanently reshape at least one surface of the man-made board.

4,169,749

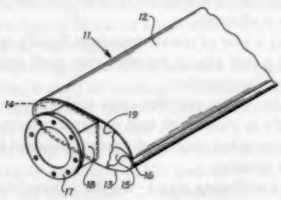
METHOD OF MAKING A HOLLOW AIRFOIL

Frank B. Clark, Glastonbury, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 21, 1977, Ser. No. 835,389

Int. Cl.[2] B64C *11/24;* **B32B** *17/04, 31/02*

U.S. Cl. 156—156 **6 Claims**



1. A method of making a section of a hollow aircraft rotor blade comprising the steps of:

forming a hollow expandable mandrel by connecting an upper skin panel, a lower skin panel, a leading edge channel and an aft channel, said panels and channels being of resin reinforced curable materials which are cemented together,

then laying a plurality of prepreg plies of curable material onto said hollow expandable mandrel to form a composite build-up,

then placing said hollow expandable mandrel with said plurality of prepreg plies thereon in a female mold,

then placing a pressure diaphragm inside said hollow mandrel which applies pressure to the inside of said hollow mandrel which, in turn, expands and transmits uniform pressure to said composite build-up,

then curing said mandrel and build-up whereby said mandrel becomes an integral part of said aircraft rotor blade.

4,169,750

LABELLING MACHINE

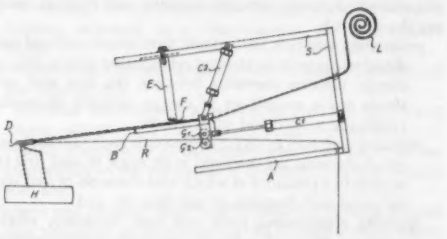
Rune T. Qwarfort, Box 1047, S-26090 Bastad, Sweden

Filed Jul. 17, 1978, Ser. No. 925,155

Claims priority, application Sweden, Jul. 19, 1977, 7708352

Int. Cl.[2] B44C *1/00;* **B32B** *35/00*

U.S. Cl. 156—541 **3 Claims**



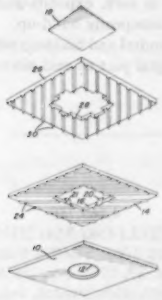
1. Labelling machine, by means of which labels can be successively applied on for instance an article, containing a storage roll (L), built in in a rack (S) or the like, for a flexible carrying strip (R) with labels (K) applied on one side, which strip is arranged to be put to the outer end of a movable labelling arm (B) fitted with an applicator (D) or the like for the purpose of loosening labels at this end and applying them on the surface of the article (H), and that the carrier (R) from there is arranged to pass between two driving rolls (G1,G2) for the carrying strip, which are connected with the arm (B), characterized by the movable arm being displaceable and pivoting by means of a first and a second control cylinder (C1,C2) fixed on the rack in that way that the arm (B) can move from the first position, in which a device (E,F) is arranged to adjust the initial position of the labels before the application of a label, to the second position, in which the outer end of the arm (B) presses slightly on the surface of the article (H), which is stationary in relation to the rack, at the same time as one of the driving rolls (G2) is pressed against a part (A) of the rack (S) or a part connected with this and by means of the effect of the first cylinder (C1) is put in rotation and then is feeding the carrier (R) at the same time as the arm is brought backwards by the cylinder (C1) a prescribed length, suitably somewhat longer than the pitch distance between two labels on the strip (R), and in doing so applies a label on the article (H), after which the other cylinder (C2) is arranged to move the arm (B) back to the first position, when also the first cylinder (C1) has been brought back to its initial position, at which the strip (R), during the bringing back of the arm (B) to the first position, is arranged to be kept at the arm (R) in the position adjusted after application of the label.

4,169,751

HIGH FREQUENCY BONDING WITH CONCENTRATORS

Edward C. Yen, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 30, 1978, Ser. No. 910,397
Int. Cl.[2] B29C *27/08;* B32B *32/16*
U.S. Cl. 156—73.1 **9 Claims**



1. The method of bonding together first, second and third thermoplastic sheets using high frequency vibratory energy and elongated energy director elements, said method comprising the steps of:

positioning said first, second and third sheets and said energy director elements in stacked relationship with a first set of energy director elements between the first and second sheets and a second set of energy director elements between the second and third sheets;

orienting said energy director elements such that said second set of elements are disposed at an angle to said first set so as to define positions at which said elements of said second set cross said elements of said first set; and

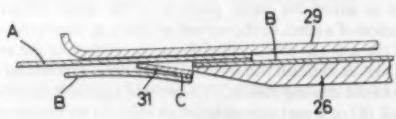
applying compressive force and high frequency vibratory energy to the stack, whereby the thermoplastic material in the region of said director elements is softened starting at said defined positions and spreading along said elements.

4,169,752

PROCESS AND APPARATUS FOR SPLICING WEB

Masateru Tokuno, Nishinomiya, Japan, assignor to Rengo Kabushiki Kaisha (Rengo Co., Ltd.), Osaka, Japan and Simon Container Machinery Limited, Stockport, England

Filed Nov. 16, 1977, Ser. No. 852,044
Claims priority, application Japan, Dec. 16, 1976, 51/151550; May 13, 1977, 52/56692
Int. Cl.[2] B65H *19/08*
U.S. Cl. 156—157 **8 Claims**



1. A process for splicing paper from a first roll of paper in a standby position to paper already being supplied from another roll of paper by an overlapping joint, said process comprising the steps of:

placing a plate member against the side of the paper from the first roll which is to be overlapped onto the opposing surfaces of the paper from the other roll and slightly spaced from and substantially parallel to the leading edge of the paper from the first roll;

applying adhesive means to said side of the paper from the first roll along the leading edge thereof with a portion thereof applied to said plate member for holding the plate member to the paper from the first roll;

holding the leading end of the paper from the first roll in position for splicing;

pressing the leading end of the paper from the first roll of paper against the opposed side of the paper from the other roll to splice the two papers in an overlapping joint by the adhesive means with said plate member held therebetween at a point just following the joint in the direction of travel of the papers; and

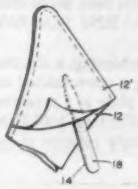
passing the thus spliced papers over a blade having a cutting edge directed in a direction opposite to the direction of travel of the papers with the side of the paper from the other roll which is opposite from the side to which the paper from the first roll has been adhered being against one side surface of said blade, thereby cutting said paper from said other roll immediately behind the portion adhered to the paper of said first roll by means of said blade cooperating with said plate member when the plate member passes said blade along the other side thereof.

4,169,753

METHOD FOR AUTOMATIC SHIRT COLLAR STAY APPLYING

David Wendell, 8803 Kelso Dr., Baltimore, Md. 21221

Division of Ser. No. 795,981, May 11, 1977, Pat. No. 4,109,810. This application Jan. 3, 1978, Ser. No. 866,698
Int. Cl.[2] A41B *3/06;* B32B *31/04, 31/26*
U.S. Cl. 156—160 **3 Claims**



1. A method of automatically attaching stiffening stays to outer end portions of collar members comprising the steps:

(a) forming a plurality of elongated stiffening stays and coating at least one side of the stiffening stays with heat sensitive adhesive;

(b) stacking the stiffening stays one upon the other in a magazine;

(c) removing the stiffening stays from the underside of the stack into a channel;

(d) providing a pair of planar members fixedly spaced apart;

(e) inserting a said planar member into each outer end portion of a collar member;

(f) drawing the collar member outer end portions at the same time tightly in-plane with said planar members by drawing the collar member outer end portions toward the center of the collar member;

(g) moving a stiffening stay along the channel to a predetermined area within an outer end portion of the collar member; and

(h) heating the stiffening stay until the heat sensitive adhesive softens and adheres to the collar member thereby attaching a stiffening stay to the outer end portion of a collar member.

4,169,754

FILTER TUBE AND METHOD OF PREPARING SAME

Kenneth A. Perrotta, Methuen, Mass., assignor to Whatman Reeve Angel Limited, Maidstone, England

Filed Jun. 3, 1977, Ser. No. 803,026
Int. Cl.[2] B31C *1/00*
U.S. Cl. 156—187 25 Claims

1. In a process for preparing a filter tube, which process comprises: preparing a plurality of interrelated, randomly dispersed, inorganic fibers having a diameter of from about 0.01 to 10 microns into a filter tube with interstices between the fibers; impregnating the filter tube with a bonding agent for the fibers; and heating the impregnated filter tube to a temperature sufficient to bond the junction of the fiber crossover points in the filter tube with the bonding agent, the improvement which comprises:

(a) impregnating the prepared filter tube with an aqueous emulsion containing a dispersed fluorocarbon polymer as the bonding agent; and

(b) coagulating the fluorocarbon polymer in the impregnated filter tube prior to any substantial coagulation by airdrying of the emulsion in the tube and prior to heating to bond the fibers, to provide a filter tube characterized by a substantially uniform deposition of coagulated and bonded fluorocarbon polymer bonding agent throughout the thickness of the wall of the filter tube, thereby providing a filter tube of improved strength.

4,169,755

GROWTH OF CRYSTALLINE RODS OF GALLIUM ARSENIDE IN A CRUCIBLE OF SPECIALLY TREATED FIBROUS SILICON DIOXIDE

Jean-Pierre Besselere, Bretteville l'Orgueilleuse, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 14, 1978, Ser. No. 886,406
Claims priority, application France, Mar. 16, 1977, 77 07835
Int. Cl.[2] B01J *17/06*
U.S. Cl. 156—616 A 6 Claims

1. A method of manufacturing a rod of crystalline gallium arsenide in a melting crucible which is formed a least substantially in part from a fabric of a refractory fibrous silicon dioxide, comprising the steps of:

a. first subjecting prior to its use said fabric to a treatment consisting mainly of wetting, by means of gallium, at least the contact surface of said fabric which comes in contact with the gallium arsenide,

b. then heating said fabric in a suitable atmosphere at a temperature between 1150° and 1200° C. until the said gallium has disappeared completely,

c. charging the treated crucible with gallium arsenide,

d. melting said gallium arsenide in said crucible, said gallium arsenide being in direct contact only with said treated fabric, and

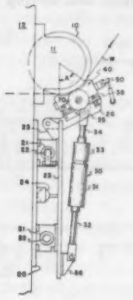
e. solidifying said gallium arsenide by progressive controlled crystallization along the length of said crucible.

4,169,756

APPARATUS FOR DETERMINING THE SURFACE ABRASIVENESS OF A PAPER MACHINE WEB

Partha S. Chaudhuri, Stoney Point, New York, assignor to Westvaco Corporation, New York, N.Y.

Filed Jul. 17, 1978, Ser. No. 924,949
Int. Cl.[2] G01N *3/56, 19/02*
U.S. Cl. 162—263 5 Claims



1. An apparatus for determining the surface abrasiveness of a papermachine web comprising:

A. A turning roll secured at the ends thereof by support bearings mounted on a papermachine dry end support frame;

B. A papermachine web coursed over an angular portion of the turning roll;

C. Pressure shoe means pivotally secured to said frame means, said shoe means having specimen clamp means to confine a specimen of sacrificial sheet material in an arc conforming to the curvature of said web over said turning roll; and

wherein said pressure shoe means comprises a saddle-shaped face having an arcuate face curved about a smaller radius than the radius of said turning roll, said specimen being secured to span said saddle-shaped face.

D. Retractable resilient bias means between said frame means and shoe means to pivot said shoe means between engagement and disengagement positions of said specimen relative to said web.

4,169,757

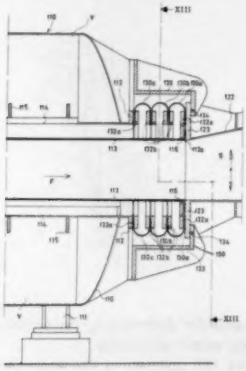
APPARATUS FOR DAMPING PRESSURE FLUCTUATIONS IN PULP SUSPENSION FLOW OF PAPER MACHINES

Alvi Kirjavainen, Jyväskylä, Finland, assignor to Valmet Oy, Finland

Filed Oct. 5, 1977, Ser. No. 839,502
Claims priority, application Finland, Oct. 5, 1976, 762826; May 26, 1977, 771693
Int. Cl.[2] D21F *1/06*
U.S. Cl. 162—380 8 Claims

3. In an apparatus for damping pressure fluctuations in a pulp-suspension flow in a paper machine, a pipe system for delivering the pulp suspension to a headbox with the suspension flowing along the interior of the pipe system, enclosure means having a hollow interior for enclosing in said hollow interior a gas such as air at a pressure greater than atmospheric pressure, said pipe system including an elastic wall means having an inner surface defining part of the interior of said pipe system for engaging pulp suspension flowing through the interior of said pipe system and an outer surface exposed in the hollow interior of said enclosure means to the gas under pressure therein, said elastic wall means responding to an increase in the pressure of the suspension with respect to the pressure of the gas for expanding to increase the cross section of said suspension flow where the suspension engages said elastic wall

means and responding to a decrease in the pressure of the suspension with respect to the gas pressure in said enclosure means for decreasing said cross section so that through said elastic wall means pressure fluctuations in the flowing pulp suspension will be damped and wherein said pipe system has a portion adjacent said enclosure means which is movable with respect thereto in connection with headbox adjustment, said elastic wall means including a tubular portion for surrounding the pulp-suspension flow and having an end fixed with said



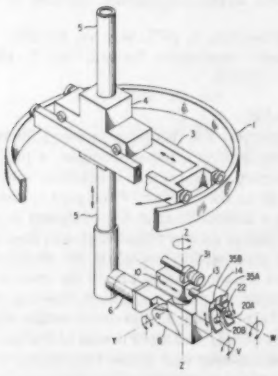
portion of said pipe system for movement therewith while forming an extension thereof so that the pulp suspension flows without interruption in the interior of said elastic wall means and said portion of said pipe system, and flexible bellows means surrounding said elastic wall means at the region where it is connected with said portion of said pipe system, said bellows means being fixed at one end together with said elastic wall means to said portion of said pipe system and at an opposite end directly to said enclosure means while being spaced from and surrounding said elastic wall means.

4,169,758

NUCLEAR REACTOR VESSEL INSPECTION APPARATUS

Eugene G. Blackstone, Canton, Ohio; Richard A. Lofy, Elm Grove, Wis., and Lawrence P. Williams, Wadsworth, Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Oct. 26, 1977, Ser. No. 845,742
Int. Cl.[2] G21C *17/00*
U.S. Cl. 176—19 R **12 Claims**



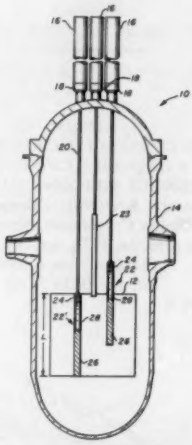
1. In an apparatus for scanning the interior surfaces of a vertical cylindrical nuclear reactor vessel filled with collant and having an upper vessel flange and the top closure head removed to expose said flange, the combination comprising, a ring girder supported from the open end, a rotatable bridge spanning said girder, a carriage supported by and linearly movable in forward and reverse directions along said bridge, an axially movable vertical mast supported in said carriage depending into the reactor vessel, a boom supported by said mast extending at a right angle therefrom toward the cylindrical surface of the reactor vessel, and an articulated ultrasonic transducer inspection head carried by said boom axially aligned with and extending beyond the end of said boom remote from said mast.

4,169,759

METHOD FOR OPERATING A NUCLEAR REACTOR WITH SCRAMMABLE PART LENGTH ROD

Frank Bevilacqua, Windsor, Conn., assignor to Combustion Engineering Inc., Windsor, Conn.

Division of Ser. No. 604,529, Aug. 14, 1975, abandoned. This application Jan. 10, 1977, Ser. No. 758,126
Int. Cl.[2] G21C *7/08*
U.S. Cl. 176—22 **1 Claim**



1. A method for controlling a nuclear reactor having a core with an active region and part length control rods moveable within the core for controlling asymmetrical axial power distributions, said rods having a first neutron poison material at their first ends, a second neutron poison material at their second ends and substantially non-neutron absorbing material between and adjacent to their first and second ends, said part length control rods having lengths substantially equal to the length of the active region of the core, the method comprising:

a. positioning said part length control rods part way into the core so that said second neutron poison material is substantially centrally positioned in the core;

b. moving said part length control rods to move said second poison in the direction of the axial power peak when an asymmetrical axial power distribution exists to reduce the neutron flux imbalance; and

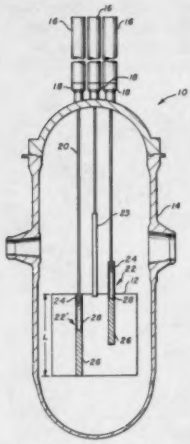
c. inserting said part length rods into the core upon occurrence of conditions requiring emergency shut down of the reactor so that at least a fraction of each of said first and second ends are simultaneously positioned within the core.

4,169,760

NUCLEAR REACTOR WITH SCRAMMABLE PART LENGTH ROD

Frank Bevilacqua, Windsor, Conn., assignor to Combustion Engineering Inc., Windsor, Conn.

Division of Ser. No. 604,529, Aug. 14, 1975, abandoned. This application Jan. 10, 1977, Ser. No. 758,125
Int. Cl.[2] G21C 7/08
U.S. Cl. 176—36 R 3 Claims



1. A nuclear reactor comprising in combination:

a. a reactor core having an active region containing fissionable material;

b. a group of moveable control rods insertible into said core for controlling the power of said nuclear reactor core;

c. moveable control means including at least one rod normally maintained partially inserted in the core for controlling asymmetrical axial power distributions, said control rod having a length substantially equal to the length of said active region of the core and having a first portion at said rod's first end containing a first neutron poison, a second portion at said rod's second end containing a second neutron poison, and a third portion whose opposite ends are adjacent to and between said first and second portions, said third portion having a small reactivity control worth relative to said first and second portions; and

d. a plurality of scrammable control rod drive mechanisms for moveably positioning each of said control rods of said group and of said control means, said control rod drive mechanisms all being of the type which rapidly insert their associated control rods into said reactor core to their full-in positions when an emergency shut down of the reactor is desired.

4,169,761

PROCESS FOR THE CULTIVATION OF VIRUSES

Pierre Précausta, 1700 Big Trail Rd., Walled Lake, Mich. 48088; Marc Bugand, Calvire; Philippe Comte, Ste. Foy-les-Lyon, and Georges Zwingelstein, Villeurbanne, all of France, assignors to Institut Merieux, Lyon, France

Filed Jun. 23, 1978, Ser. No. 918,962
Claims priority, application France, Jun. 30, 1977, 77 20115
Int. Cl.[2] C12B 3/00; C12K 9/00
U.S. Cl. 435—235 14 Claims

1. Process for the cultivation of a virus which comprises cultivating the virus in a fermenter containing, in an appropriate nutritive medium, a suspension of cells and collagen fibres.

4,169,762

SELF-TOXIFICATION PROCESS FOR AEROBIC FERMENTATION

Donald O. Hitzman, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 25, 1977, Ser. No. 827,761
Int. Cl.[2] C12B 1/08, 1/20
U.S. Cl. 435—243 19 Claims

1. A self-toxification method for an aerobic fermentatation process utilizing oxygen and a carbon source in a fermentation medium in amounts sufficient for propagating at least one microorganism capable of generating a biocidal agent, said method comprising:

(a) starving the microorganism of a growth essential material by lowering the concentration of growth essential material in the fermentation medium to a level at which the microorganism substantially ceases to propagate for a period of time sufficient to substantially cease the propagation of the microorganism;

(b) after the propagation of the microorganism has substantially ceased, introducing the growth essential material into the fermentation medium in a quantity sufficient to cause the microorganism to generate a toxic concentration of a biocidal agent and thereby kill the microorganism, said quantity of growth essential material being less than the quantity of growth essential material necessary to kill the microorganism in the absence of the starvation step.

4,169,763

PROCESS FOR THE PRODUCTION OF L-LYSINE BY FERMENTATION

Kiyoshi Nakayama, Sagamihara; Kazumi Araki, and Yoshitake Tanaka, both of Machida, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Japan

Filed Jul. 11, 1977, Ser. No. 814,621
Claims priority, application Japan, Jul. 9, 1976, 51-81016
Int. Cl.[2] C12D 13/06
U.S. Cl. 435—115 6 Claims

2. A process for producing L-lysine by fermentation, which comprises culturing a mutant strain belonging to the species *Corynebacterium glutamicum* and having both an improved ability to produce L-lysine and a resistance to at least one member selected from the group consisting of an aspartic acid analog selected from the group consisting of aspartic acid hydroxamate, α-methylaspartic acid, β-methylaspartic acid, cysteinesulfinic acid, difluorosuccinic acid and hadacidin and a sulfa drug selected from the group consisting of sulfaguanidine, sulfadiazine, sulfamethazine, sulfamerazine, sulfamethizole, sulfamethomidin, sulfamethoxypyridazine, sulfathizole, homosulfamine, sulfadimethoxine, sulfamethoxazole and sulfaisoxazole in a nutrient medium, forming and accumulating L-lysine in the resulting culture liquor and isolating the L-lysine therefrom.

4,169,764

PROCESS FOR PRODUCTION OF UROKINASE

Kenji Takezawa, Yokohama; Masaharu Nakanishi, Koza, and Yasumi Yugari, Kamakura, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Continuation-in-part of Ser. No. 711,396, Aug. 3, 1976, abandoned. This application Nov. 14, 1977, Ser. No. 851,480
Claims priority, application Japan, Aug. 13, 1975, 50-98408
Int. Cl.[2] C07G 7/026
U.S. Cl. 435—215 12 Claims

1. A process for the production of urokinase from human urine in which urine or a dilute aqueous mixture thereof is adsorbed on an adsorbent for urokinase and thereafter eluted with an aqueous cationic surfactant mixture at a pH of from 6 to 9 and a surfactant concentration which is effective for eluting urokinase.

4,169,765

APPARATUS FOR THE QUANTITATIVE DETERMINATION OF α-AMYLASE

Melvin H. Keyes, Sylvania, Ohio, assignor to Technicon Instruments Corp., Tarrytown, N.Y.

Division of Ser. No. 833,318, Sep. 14, 1977. This application May 12, 1978, Ser. No. 905,498

Int. Cl.[2] **G01N** *31/14*

U.S. Cl. 435—291 **25 Claims**

1. Apparatus for the quantitative determination of α-amylase contained in an aqueous solution sample which comprises, in combination, a reservoir containing a buffer diluent solution and means for establishing a flowing stream of said buffer solution, injection means for injecting said sample in said stream of buffer solution, container means comprising immobilized scavenger reagents for removing glucose which initially contaminates said sample, container means comprising an immobilized starch reagent for reacting with α-amylase contained in said sample and producing oligosaccharides therein, container means comprising immobilized glucose-generating reagent for reacting with said oligosaccharides to produce a glucose reaction product in said sample, detection means comprising a chamber containing immobilized reagent for oxidizing said glucose reaction product to generate hydrogen peroxide and detection means for measuring the amount of generated hydrogen peroxide.

4,169,766

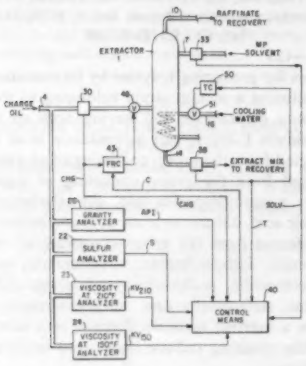
CONTROL SYSTEM FOR AN N-METHYL-2-PYRROLIDONE REFINING UNIT RECEIVING LIGHT SOUR CHARGE OIL

Avilino Sequeira, Jr., and Frank L. Barger, both of Port Arthur, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Oct. 19, 1978, Ser. No. 952,897

Int. Cl.[2] **C10G** *21/00*; **C06G** *7/58*

U.S. Cl. 196—14.52 **9 Claims**



1. A control system for a refining unit receiving light sour charge oil and N-methyl-2-pyrrolidone solvent, one of which is maintained at a fixed flow rate while the flow rate of the other is controlled by the control system, treats the received light sour charge oil with the received N-methyl-2-pyrrolidone to yield extract mix and raffinate, comprising gravity analyzer means for sampling the charge oil and providing a signal API corresponding to the API gravity of the charge oil, sulfur analyzer means for sampling the charge oil and providing a signal S corresponding to the sulfur content of the charge oil, viscosity analyzer means for sampling the charge oil and providing signals KV_{150} and KV_{210} corresponding to the kinematic viscosities, corrected to 150° F. and 210° F., respectively, flow rate sensing means for sensing the flow rates of the charge oil and of the N-methyl-2-pyrrolidone and providing signals CHG and SOLV, corresponding to the charge oil flow rate and the N-methyl-2-pyrrolidone flow rate, respectively, temperature sensing means for sensing the temperature of the extract-mix and providing a corresponding signal T, and control means connected to all of the analyzer means, and to all the sensing means for controlling the other flow rate of the charge oil and the methyl-2-pyrrolidone flow rates in accordance with signals API, S, KV_{210}, KV_{150}, T, CHG and SOLV.

4,169,767

PROCESS FOR CALCINING COKE

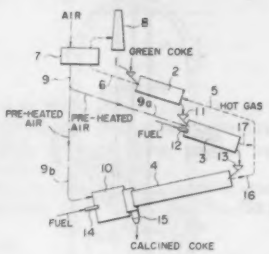
Kosaku Noguchi, Tokyo, and Nobuyuki Komi, Mitaka, both of Japan, assignors to Koa Oil Company, Limited, Tokyo, Japan

Filed Mar. 24, 1978, Ser. No. 890,707

Claims priority, application Japan, Jun. 27, 1977, 52-76267

Int. Cl.[2] **C10B** *57/00*; **C01B** *31/02*

U.S. Cl. 201—27 **7 Claims**



1. A process for calcining green coke containing substantial amounts of water and combustible volatile matter obtained by a delayed coking process in three rotary kilns which are connected in series and wherein the control of the temperature and the adjustment of the atmosphere can be independently carried out, which process comprises carrying out, in the respective kilns in the indicated order, the steps of:

(a) evaporating the water contained in the green coke, and drying and pre-heating the coke to give a final coke temperature in the range of from 350° to 400° C. with off-gases from steps (b) and (c) mentioned hereinbelow,

(b) distilling off and burning the volatile matter of the dried coke through a second rotary kiln in an oxidation atmosphere for about 30 to 60 minutes to give a final coke temperature of 800° to 980° C. with air flowing concurrently with the coke,

(c) heating and calcining the coke from the step (b) at a temperature of 1,200° to 1,500° C. for 10 to 30 minutes by using as the heating medium a combustion gas obtained by burning fuel at the outlet of the third rotary kiln.

4,169,768

POLARIZATION EVALUATION OF METAL DEGRADATION PROCESSES

Ewa A. Bardasz, Cranford, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Feb. 27, 1978, Ser. No. 881,647

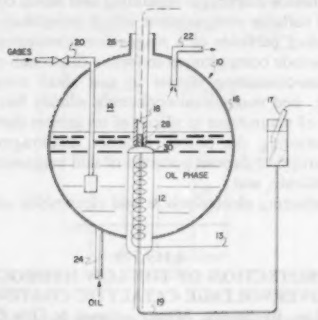
Int. Cl.[2] **G01N** *27/46*

U.S. Cl. 204—1 T **9 Claims**

1. A polarization cell for use in estimating rates of metal degradation of a metal test specimen which occurs at metal/-liquid interfaces, comprising: a first compartment which contains a first liquid phase at a first level; a second compartment disposed at least in part within said first liquid phase and which contains a second, conductive liquid phase at a second level and is immiscible and of greater density relative to said first phase, said first level being above said second level; a first electrode being disposed within said second liquid phase in said second compartment; and a second electrode comprising said metal test specimen being disposed within said first liquid phase at a predetermined distance spaced from said first electrode and also in contact with said second phase and capable of accepting an imposed potential, said test specimen having a

surface in contact with said second phase which is smaller in size than the corresponding dimension of said second compartment, so that said test specimen electrode is capable of insertion into said second compartment, whereby said cell simulates conditions which occur in field operations involving metal corresponding to said metal test specimen.

6. A method for evaluating metal degradation comprising the steps of: placing a metal specimen comprising a first electrode into a cell comprising a first compartment containing a first nonconductive liquid phase and immersing said first electrode into said first liquid phase for a predetermined period of time sufficient to form a film on at least a surface thereof with said first phase; providing a second compartment in said cell containing a second, conductive liquid phase in contact with said first liquid phase; said surface being smaller in size than the corresponding dimension of said second compartment; immersing said surface with said film in said second, conductive liquid phase at a desired distance spaced from a second electrode; applying an external potential between said first and second electrodes; and monitoring the current flow between said first and second electrodes.



4,169,769

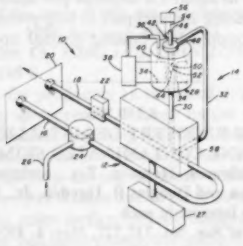
METHOD FOR CONVEYING A GAS SAMPLE THROUGH AN ANALYZER CHAMBER

David M. Capone, Oakmont, Pa., assignor to Thermo-Lab Instruments, Inc., Pittsburgh, Pa.

Division of Ser. No. 739,712, Nov. 8, 1976, Pat. No. 4,115,235. This application May 11, 1978, Ser. No. 904,876

Int. Cl.[2] G01N *27/46*

U.S. Cl. 204—1 T 5 Claims



1. A method for sampling a gaseous fluid in a chamber comprising,

withdrawing a continuous flow of sample gas along a first loop type flow path extending from said chamber through a flow inducing device and back to said chamber,

joining inlet and outlet legs of a second loop type flow path at substantially the same location along the length of said first loop type flow path,

positioning said second loop type flow path upstream of said flow inducing device,

withdrawing a portion of said sample gas along said second loop type flow path through said inlet leg thereof,

electrochemically sensing the condition of said gas in said second loop type flow path, and

returning said sensed gas through said outlet leg of said second loop type flow path to said first loop type flow path upstream of said flow inducing device.

4,169,770

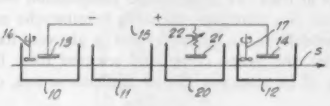
ELECTROPLATING ALUMINUM ARTICLES

William E. Cooke, and John Hodgson, both of Kingston, Canada, assignors to Alcan Research and Development Limited, Montreal, Quebec, Canada

Filed Feb. 21, 1978, Ser. No. 879,465

Int. Cl.[2] C25D *5/44, 7/06*

U.S. Cl. 204—28 21 Claims



1. A process for the production of metal-plated, elongated aluminum stock which comprises passing the aluminum stock continuously (1) during less than a minute through a caustic electrolytic cleaning bath having a pH of at least 11 and containing an electrolyte having a high dissolving power for aluminum oxide and consisting essentially of a solution of caustic selected from a group consisting of sodium hydroxide and potassium hydroxide, while effecting agitation of one of the article and bath relative to the other; and subsequently (2) through an electroplating bath containing a metal plating electrolyte, the first-mentioned bath having a cathode electrode immersed therein and the second-mentioned bath having an anode electrode immersed therein whereby to render the stock anodic in the first bath and cathodic in the second bath; the composition and temperature of the solution in the first bath, and the voltage across said bath of at least 0.8 volt, being effective to clean the aluminum by the electrolytic treatment and the passage of the aluminum through the first bath, including the electrolytic treatment, being sufficient to deliver the aluminum essentially free of oxide on its surface.

4,169,771

DUCTILE BRIGHT ZINC ELECTROPLATING BATH AND PROCESS AND ADDITIVE THEREFOR

Hans-Gerhard Creutz, deceased, late of Yale, Mich. (by Katharina A. Creutz, administratrix); Roy W. Herr, Troy, and Sylvia Martin, Detroit, both of Mich., assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed Apr. 20, 1978, Ser. No. 897,979

Int. Cl.[2] C08G *59/02, 59/14;* C25D *3/22, 3/24*

U.S. Cl. 204—55 R 7 Claims

1. A brightener for aqueous zinc electroplating solutions comprising a bath soluble cationic alkylated condensation polymer obtained by alkylation of a polymer prepared by the reaction of from about 0.5 to about 1.0 mol epihalohydrin compound per mol of a heterocyclic compound having a five or six membered ring containing at least two nitrogen atoms, which polymer is then alkylated with about 0.1 to about 0.5 mol per mol of said heterocyclic compound of an alkylating agent corresponding to the formula:

$$[X—R—N(R')_3]^+X^-$$

Wherein:

R=ethyl or 2-hydroxy propyl,

R'=an alkyl group of 1 to 4 carbons, and

X=Cl, Br or I.

6. An aqueous zinc electroplating solution comprising zinc ions and an effective amount of the bath soluble cationic alkylated condensation polymer as claimed in claim 1.

4,169,772

ACID ZINC PLATING BATHS, COMPOSITIONS USEFUL THEREIN, AND METHODS FOR ELECTRODEPOSITING BRIGHT ZINC DEPOSITS

Richard K. Lowery, Garfield Heights, and William J. Willis, North Royalton, both of Ohio, assignors to R. O. Hull & Company, Inc., Cleveland, Ohio

Filed Nov. 6, 1978, Ser. No. 958,124
Int. Cl.[2] C25D 3/22
U.S. Cl. 204—55 R 23 Claims

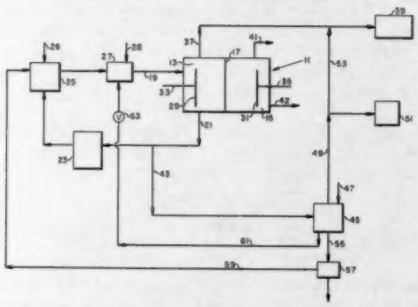
1. An aqueous acidic plating bath for the electrodeposition of a bright zinc deposit on a substrate which comprises zinc ions and (A) an amount, sufficient to provide a level and bright deposit, of at least one bath-soluble composition obtained by the reaction of a nitrogen-containing heterocyclic compound with formaldehyde, an epihalohydrin or glycerol halohydrin, and at least one amino compound selected from the group consisting of (i) ammonia, (ii) an aliphatic amine, or (iii) an amidine.

4,169,773

REMOVAL OF CHLORATE FROM ELECTROLYTIC CELL ANOLYTE

Peter Lai, Grand Island; Stanley Szymanski, Youngstown, and Norman L. Christensen, Cheektowaga, all of N.Y., assignors to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Filed Jan. 16, 1978, Ser. No. 870,054
Int. Cl.[2] C25B 1/16, 1/26, 1/02
U.S. Cl. 204—98 12 Claims



12. A process for the electrolytic production of sodium hydroxide and chlorine, which process comprises electrolytically decomposing a sodium chloride brine in an electrolytic cell comprising an anode, a cathode, an anode compartment, a cathode compartment and a permselective cationic membrane separating said anode compartment and said cathode compartment; recirculating spent brine from said anolyte compartment, resaturating said spent brine and feeding resaturated spent brine to said membrane cell anode compartment; diverting from 0.5 to 50% of said spent brine prior to resaturation to a reaction zone outside the electrolytic cell, and treating said diverted spent brine with an excess amount of hydrochloric acid to decompose sodium chlorate present therein; decomposing the chlorine dioxide that is formed by the reaction of said sodium chlorate and said hydrochloric acid to form chlorine and oxygen; recovering said chlorine; recovering excess hydorchloric acid, sodium chloride and water; and recirculating said excess hydrochloric acid, sodium chloride and water to the anode compartment of said cell.

4,169,774

METHOD OF TREATING ASBESTOS DIAPHRAGMS FOR ELECTROLYTIC CELLS

Igor V. Kadija, and Harshad M. Patel, both of Cleveland, Tenn., assignors to Olin Corporation, New Haven, Conn.

Filed Jul. 21, 1978, Ser. No. 926,772
Int. Cl.[2] C25B 13/06, 1/16, 1/26
U.S. Cl. 204—98 15 Claims

1. A method for electrolyzing an alkali metal chloride brine in an electrolytic cell having an anode compartment containing said alkali metal chloride brine, a cathode compartment, and a porous asbestos diaphragm separating said anode compartment from said cathode compartment which comprises:

(a) feeding particles of a magnesium-containing silicate to said anode compartment to form a dispersion of said magnesium-containing silicate in said alkali metal chloride brine, said magnesium-containing silicate having a mole ratio of magnesium to silicon of no greater than about 1:1,

(b) contacting the porous asbestos diaphragm with said dispersion to deposit particles of said magnesium-containing silicate, and

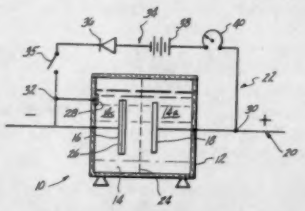
(c) conducting electrolysis in said electrolytic cell.

4,169,775

PROTECTION OF THE LOW HYDROGEN OVERVOLTAGE CATALYTIC COATINGS

Han C. Kuo, Burlington, Mass., assignor to Olin Corporation, New Haven, Conn.

Filed Jul. 31, 1978, Ser. No. 929,375
Int. Cl.[2] C25B 1/16, 1/26, 9/04
U.S. Cl. 204—98 8 Claims



3. A method of protecting a low hydrogen overvoltage catalytic coating of a cathode of a chlor-alkali cell having an electrolyte in contact with said cathode and having exposed to said electrolyte at least one metal part of a hydrogen overvoltage greater than the hydrogen overvoltage of cathode, which comprises the steps of:

applying a small cathodic protection direct current of from about 0.01 to about 1.0 amperes per square meter to the cathode coating and said part to help protect said cathode from corrosion while ceasing normal operation of said cell.

4,169,776

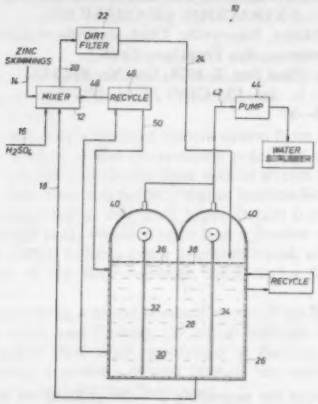
METHOD FOR RECOVERY OF METALLIC ZINC FROM CHLORINE CONTAMINATED SKIMMINGS

William L. Eddleman, Houston, Tex., assignor to David B. Dean, Houston and Douglas B. Hayden, Jr., Beaumont, both of, Tex., part interest to each

Continuation of Ser. No. 737,727, Nov. 1, 1976, abandoned, which is a continuation of Ser. No. 610,246, Sep. 4, 1975, abandoned. This application May 25, 1978, Ser. No. 909,353
Int. Cl.[2] C25C 1/16, 7/04
U.S. Cl. 204—118 7 Claims

1. A method of recovering elemental zinc from a solution of zinc compounds which comprises the steps of placing the zinc compounds in solution with an aqueous acid solution in a container divided into anode and cathode compartments containing, respectively, an anode and a cathode by a microporous polymer diaphragm characterized by having a reduced bulk

density as compared to the bulk density of the corresponding polymer film having no open-celled structure, a crystallinity of above about 30%, a pore size of less than 5,000 angstroms, and a nitrogen flux, measured after one hour storage at 65° C., of more than 30, which is permeable to anions and acid cations



inherently and specially processed to provide a pore structure which provides a barrier to water including water of hydration and flowing a DC current through the anode and cathode positioned in solution on opposite sides of the diaphragm to form elemental zinc at the cathode.

4,169,777

PROCESS FOR PRODUCING AN ACTIVATED OXYGEN GAS SENSOR ELEMENT

Ching T. Young, Troy, Mich.; Donald J. Romine, Fostoria, Ohio; Phillip R. Woodruff, Tiffin, Ohio; Donald C. Davis, Fostoria, Ohio; James D. Bode, Royal Oak, and Tseng Y. Tien, Ann Arbor, both of Mich., assignors to Bendix Autolite Corporation, Fostoria, Ohio

Continuation-in-part of Ser. No. 885,423, Mar. 13, 1978, Pat. No. 4,136,000. This application Sep. 13, 1978, Ser. No. 942,103

The portion of the term of this patent subsequent to Jan. 23, 1996, has been disclaimed.

Int. Cl.[2] C23G *1/02*; G01N *27/58*

U.S. Cl. 204—195 S **16 Claims**

1. A process for producing an activated oxygen gas sensor element having an increased voltage output under rich gas conditions, shortened switching response time and reduced internal resistance, wherein the sensor element comprises a solid electrolyte body having an inner conductive catalyst electrode on the inner surface and an outer conductive catalyst electrode on the outer surface thereof, comprising:

(a) contacting said inner conductive catalyst electrode with an acidic reactant selected from the group consisting of inorganic acids and acid salts; and

(b) applying a direct current to the sensor element, with said outer conductive catalyst electrode as an anode, while subjecting said outer conductive catalyst electrode to a nonoxidizing atmosphere at an elevated temperature in excess of 450° C., the current density thereof being at least 5 milliamperes per square centimeter of the planar surface of said outer conductive catalyst electrode.

4,169,778

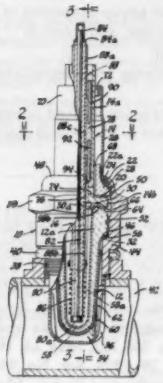
HEATED SOLID ELECTROLYTE OXYGEN SENSOR

Gamdur S. Mann; Michael P. Murphy, both of Flint; David R. Fredericks, Grand Blanc, and Kenneth R. Deming, Flint, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 16, 1978, Ser. No. 961,137

Int. Cl.[2] G01N *27/58*

U.S. Cl. 204—195 S **3 Claims**



1. In a coaxial cylindrical galvanic exhaust gas oxygen sensor have a metal shell, an electrolyte member, an electrode terminal tube and a heater, and the heater is supported in a subassembly with the electrode terminal by a fused glass bond, the improvement wherein the heater comprises a ceramic tube having two open ends, a resistance heating coil wound around one tube end and directly exposed to said electrolyte member, a metal rod coaxially fixed in the tube with its ends and outwardly displaced from tube ends, one rod end electrically connected to an end of said coil and the other rod end providing an inner coaxial terminal for said heating coil, and a metal member crimped around the outside of said ceramic tube and electrically connected to an opposite end of said heating coil but leaving a major proportion of said ceramic tube circumference exposed, whereby electrolyte member heating efficiency is increased, subassembly costs are reduced, and electrode terminal bonding is enhanced.

4,169,779

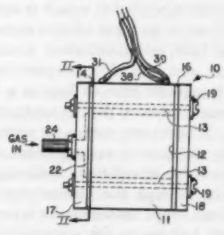
ELECTROCHEMICAL CELL FOR THE DETECTION OF HYDROGEN SULFIDE

Harshad Tataria, Miami, Fla., and Alan A. Schneider, Reisterstown, Md., assignors to Catalyst Research Corporation, Baltimore, Md.

Filed Dec. 26, 1978, Ser. No. 972,735

Int. Cl.[2] G01N *27/46*

U.S. Cl. 204—195 P **13 Claims**



1. An electrochemical cell for use in detecting H_2S gas comprising:

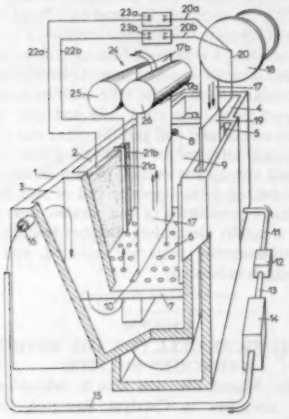
a. first and second spaced apart electrodes, each of said electrodes consisting of a gas permeable membrane having bonded thereto a catalyst portion consisting essentially of gold for said first electrode and gold or platinum black for said second electrode, said catalyst portions being positioned to face each other;
b. an electrolyte contained between said electrodes and in contact with the catalyst portion and membrane of each said electrodes, said electrolyte consisting of a solvent selected from the group consisting of propylene carbonate and γ-butyrolactone, and from 10^{-5} molar to satuation of an inorganic salt;
c. means for containing said electrolyte and said electrodes; and
d. means for maintaining a fixed potential of the first electrode with respect to the second electrode of between 300 and 1100 mv.

4,169,780

PROCESS AND APPARATUS FOR MAKING NEGATIVE ELECTRODES, IN PARTICULAR IN CADMIUM OR ZINC, FOR ELECTROCHEMICAL GENERATORS, AND THE NEGATIVE ELECTRODES THUS OBTAINED

Bernard Stiker, Paris, and Fernand Jolas, Rueil Malmaison, both of France, assigaors to Societe les Piles Wonder, France

Division of Ser. No. 908,783, May 23, 1978. This application Sep. 29, 1978, Ser. No. 947,029
Claims priority, application France, May 24, 1977, 77 15843
Int. Cl.² C25D *7/06*
U.S. Cl. 204—206 **7 Claims**



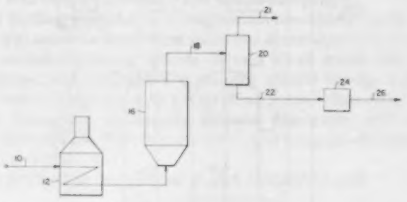
1. A device for providing the deposit of an active metal layer on a continuous tape, characterized in that it comprises on the one hand, an electrolysis vat comprising a main electrodeposition compartment containing an electrolytic bath with ions of the active metal to be deposited in which is immersed an electrode in said active metal, an input compartment for the arrival of the electrolytic bath, communication means between said input compartment and said electrodeposition compartment for causing the electrolytic bath to flow in a laminar fashion from the input compartment to the electrodeposition compartment, an output compartment, means for providing the overflow of the electrodeposition compartment into the output compartment, means for circulating continuously in the electrodeposition bath, through the electrolytic bath contained therein, the continuous tape on which the layer of active metal is to be deposited, and means for negatively polarizing said tape and positively polarizing said electrode, and on the other hand, a calender arranged in the vicinity of the electrodeposition compartment of the vat and means for passing said tape at the output of the electrodeposition compartment through the cylinders of said calender.

4,169,781

DENITRIFICATION BY FURFURAL-FERRIC CHLORIDE EXTRACTION OF COKER OIL

Stephen J. Miller, Emeryville, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jun. 2, 1978, Ser. No. 912,153
Int. Cl.² C10G *29/12, 21/16*
U.S. Cl. 208—97 **7 Claims**



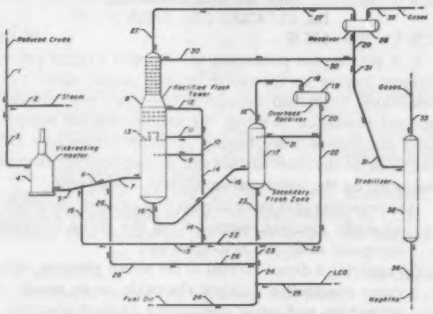
1. A process for upgrading a hydrogenated oil containing nitrogenous components above 300 parts per million, measured as nitrogen, comprising: (1) coking said hydrogenated oil to produce coke and a coker oil, said coker oil having a lower weight proportion of nitrogenous components contained therein than said coke; (2) extracting a major portion of said nitrogenous components from said coker oil with a solution of ferric chloride, said extracting being conducted under conditions including (a) a temperature in the range from about 0° to 50° C., and (b) a solution-to-oil volume ratio in the range from about 0.1 to 5, said solution comprising at least a major portion of furfural as a solvent thereof and containing said ferric chloride therein in the range from about 0.001 to 10 weight percent, thereby forming a raffinate oil phase containing a minor portion of said coker oil nitrogenous components and an extract phase containing a major portion of said coker oil nitrogenous components; and (3) separation said raffinate oil phase from said extract phase.

4,169,782

VISBREAKING PROCESS

H. Lytle Thompson, Park Ridge, Ill., assignor to UOP Inc., Des Plaines, Ill.

Filed Jan. 6, 1978, Ser. No. 867,548
Int. Cl.² C10G *37/00*
U.S. Cl. 208—102 **3 Claims**



1. A process for thermally treating a heavy hydrocarbonaceous charge stock which comprises the steps of:
(a) passing a feed stream comprising petroleum derived hydrocarbonaceous compounds having an API gravity of

less than 20.0° and having a 10% distillation temperature over 250° C. through a visbreaking heater operated at visbreaking conditions, and effecting the cracking of hydrocarbonaceous compounds and the production of a visbreaker effluent stream;

(b) cooling the visbreaker effluent stream at least 30 Centigrade degrees by admixing the visbreaker effluent stream with a quench stream;

(c) passing the visbreaker effluent stream into a rectified flash zone operated with a bottom temperature within the range of 365° C. to 460° C. and a pressure of from 45 psig. to 150 psig.;

(d) withdrawing a distillate sidecut stream from the rectified flash zone at a first intermediate point and returning at least a portion of the distillate sidecut stream to the rectified flash zone at a second, higher intermediate point;

(e) withdrawing an overhead vapor stream from the rectified flash zone, condensing at least a portion of the overhead stream to form a first overhead liquid, and passing a stream of the first overhead liquid into a fractionation column;

(f) withdrawing a liquid bottoms stream from the rectified flash zone, and flashing the liquid bottoms stream in a secondary flash zone maintained at flashing conditions including a pressure at least 30 psig. less than that maintained in the rectified flash zone;

(g) withdrawing a residue liquid stream from the bottom of the secondary flash zone, and removing at least a portion of the residue liquid stream from the process as a product; and

(h) condensing overhead vapors removed from the secondary flash zone to form a second overhead liquid having a temperature less than 150° C., passing a first stream of the second overhead liquid into the secondary flash zone and admixing a second stream of the second overhead liquid with a portion of the distillate sidecut stream as the quench stream of step (b).

4,169,783

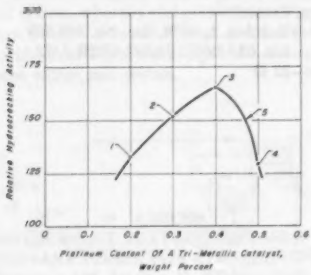
HYDROCARBON CONVERSION CATALYTIC COMPOSITE

Lee Hilfman, Mt. Prospect, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 684,055, May 6, 1976, abandoned. This application Jun. 27, 1977, Ser. No. 843,172

Int. Cl.[2] C10G *13/02;* **C07C** *5/24;* **B01J** *29/12*

U.S. Cl. 208—111 **4 Claims**



1. A process for the conversion of a hydrocarbon oil heavier than gasoline which comprises reacting said hydrocarbon oil with hydrogen at hydrocarbon conversion conditions in a reaction zone containing a catalytic composite consisting essentially of a combination of a nickel component, a molybdenum component and a platinum component with a zeolitic carrier material wherein said platinum component is present in an amount sufficient to result in the composite containing, on an elemental basis, about 0.2 to about 0.5 percent by weight platinum.

4,169,784

CATALYTIC CRACKING PROCESS USING A PASSIVATION AGENT AND AN OXIDATION PROMOTER

Richard H. Nielsen, and Glenn H. Dale, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 15, 1978, Ser. No. 933,939

Int. Cl.[2] C10G *11/04, 9/16;* **B01J** *8/24, 23/56*

U.S. Cl. 208—113 **13 Claims**

1. A catalytic cracking process which uses a metals passivation agent and an oxidation promoter simultaneously wherein at about the same time the passivation agent is charged at an excessive rate to a reactor for a period of time the charge rate of the oxidation promoter is increased an effective amount and for an effective period of time to thereby allow the benefits of both agents to be realized.

4,169,785

REFORMING WITH MULTIMETALLIC CATALYSTS

Paul E. Eberly, Jr., Baton Rouge, La., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 862,115, Dec. 19, 1977, which is a continuation-in-part of Ser. No. 826,996, Aug. 23, 1977, abandoned. This application Oct. 12, 1978, Ser. No. 950,739

Int. Cl.[2] C10G *35/08*

U.S. Cl. 208—139 **2 Claims**

1. A process for reforming a hydrocarbon feed at reforming conditions which comprises contacting said feed at reforming conditions with a catalyst which comprises a Group VIII noble metal hydrogenation-dehydrogenation component, a component comprised of iridium or rhenium, or both, a halogen component, and sufficient of a tellurium component to increase the activity or selectivity, or both, as contrasted with a catalyst otherwise similar except that it does not contain tellurium.

4,169,786

DENSE MEDIUM SEPARATION

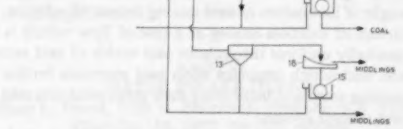
David W. Horsfall, 114, Killarney Park, 5th St., Killarney, Johannesburg, Transvaal, South Africa

Filed Nov. 17, 1977, Ser. No. 852,528

Claims priority, application South Africa, Nov. 17, 1976, 76/6878

Int. Cl.[2] B03B *7/00*

U.S. Cl. 209—12 **1 Claim**



1. A process in which fine coal is passed with a magnetic dense medium suspension to a first densimetric hydrocyclone to yield an overflow containing less dense coal particles and some of the dense medium particles and an underflow containing dense coal particles and some dense medium particles, the overflow and the underflow is passed through second and third densimetric hydrocyclones respectively, each of the second and third hydrocyclones yielding a secondary underflow containing substantially only dense medium particles and a secondary overflow containing the bulk of the coal particles, the secondary overflow in each case is passed through a

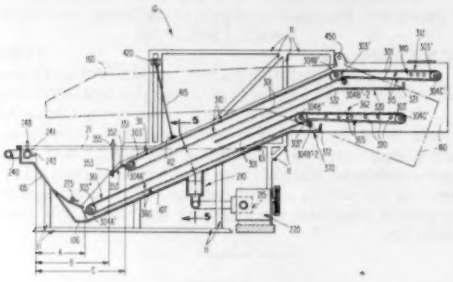
screening step to screen out coal particles coarser than the dense medium particles, and the undersize from each screening step is subjected to magnetic separation for the recovery of the remaining dense medium particles, the thus recovered dense medium particles and the secondary underflows being recycled to make up the magnetic dense medium suspension.

4,169,787

APPARATUS AND METHOD FOR LIQUID SEPARATION OF MATERIALS

Robert E. Gunnerson, Woodbury, N.J., assignor to Campbell Soup Company, Camden, N.J.

Filed Dec. 12, 1977, Ser. No. 859,433
Int. Cl.[2] B03B *5/40*
U.S. Cl. 209—173 **19 Claims**



1. An apparatus for separation of materials comprising a mixture of constituents or groups of constituents which include a first and second group each differing in specific gravity, said mixture of materials being separable, based upon their respective differences in specific gravities, said materials being thrust into a receptacle to disperse same and break them apart, comprising:

a receptacle having a length and width and a receiving portion, said receptacle containing a homogeneous solution of predetermined density wherein said receptacle is filled with said solution to a predetermined level;

manifold means in operative engagement with said receiving portion of said receptacle and located beneath said solution level for issuing a stream of solution toward said discharge portion of said receptacle, and for varying the angle of inclination of said issuing stream of solution, said stream of solution issuing at a rate of flow which is substantially uniform throughout said width of said receptacle, and which impinges upon said materials further dispersing same and facilitating their separation into said first and second groups;

suction means in fluid engagement with said receptacle and said manifold means for removing said solution from said receptacle and distributing same to said manifold means;

first conveyor means disposed in said discharge portion of said receptacle having a receiving portion and a discharge portion, said receiving portion of said first conveyor means being submerged in said solution at a point just below said solution level, for removing said first group of materials; and

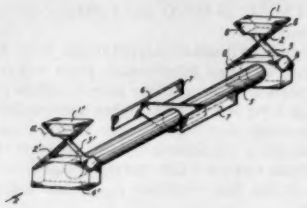
second conveyor means disposed below said first conveyor means in said discharge portion of said receptacle for removal of said second group of materials.

4,169,788

SCREENING MACHINE

Peter Grunbaum, Graz, Austria, assignor to Binder & Co. Aktiengesellschaft, Gleisdorf, Austria

Filed Mar. 2, 1978, Ser. No. 882,822
Claims priority, application Austria, Mar. 23, 1977, 2034/77
Int. Cl.[2] B07B *1/54*
U.S. Cl. 209—328 **9 Claims**



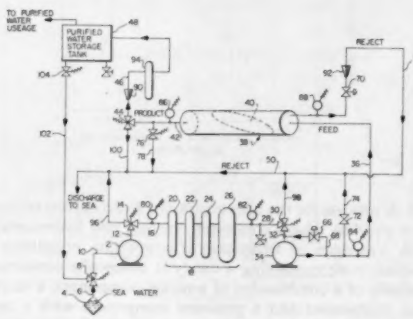
1. In a screening machine comprising a frame, a screen mounted on the frame, and a screen vibrator mounted on the frame having a striking element for vibrating the screen and drive means for moving the striking element to provide the vibration, the improvement which comprises said drive means including two universal joint springs, each spring comprising crossing elements, an end of each crossing element being mounted on the frame, and a connecting member joining the other end of each crossing element, the connecting members of the springs being disposed on the same side of the screen, the crossing elements of each spring crossing each other substantially in the plane of the screen, and mounting means securing the striking element to the connecting members and comprising a bar joining the connecting members, the bar being moveable in the direction of the plane of the screen and transversely to its length to move the connecting members to rotate the striking element about the crossing points of the crossing elements as the center of rotation for the striking element, whereby the striking element is substantially moved only vertically.

4,169,789

PROCESS AND APPARATUS FOR PURIFYING SEA WATER BY REVERSE OSMOSIS

Henry Lerat, St. Cloud, France, assignor to Permo SA, Rueil Malmaison, France

Filed Jun. 1, 1978, Ser. No. 911,959
Int. Cl.[2] B01D *13/00*; C02B *1/82*
U.S. Cl. 210—22 D **38 Claims**



1. A process for purifying sea water to form potable water, said process comprising:

withdrawing sea water from the sea;

passing the thus withdrawn sea water at a low pressure through at least four plural-stage physical filters having decreasing degrees of porosity, taken in the direction of flow of said sea water, thereby filtering suspended particles and colloids from said sea water;

providing at least one reverse osmosis module including therein at least one semi-permeable membrane having an upstream side and a downstream side, a sea water feed inlet extending into said module on said upstream side of said membrane, a reject outlet leading from said module on said upstream side of said membrane, and a purified water outlet leading from said module on said downstream side of said membrane;

feeding the sea water filtered by said plural filters into said feed inlet of said module at a high pressure higher than the osmotic pressure of said sea water;

causing a first volume portion of said sea water to pass by reverse osmosis through said membrane to said downstream side of said membrane, said membrane preventing the passage therethrough of substantially all of the dissolved salts in said first volume portion, thereby removing said dissolved salts from said first volume portion and forming said first volume portion into purified potable water, whereby said dissolved salts removed from said first volume portion are added to a second volume portion of said sea water remaining on said upstream side of said membrane, thus increasing the dissolved salt concentration of said second volume portion and forming a reject flow;

removing said purified potable water from said module through said purified water outlet;

removing said reject flow from said module through said reject outlet;

controlling the conversion level of said module at a value to prevent the formation on said membrane of sulfates and carbonates, wherein:

$$\text{conversion level (\%)} = \frac{\text{Volume of Purified Water (100)}}{\text{Volume of Sea Water Fed to Module}};$$

passing said purified potable water removed from said module to a fresh water storage tank; and

upon shutdown of the system, flushing the entire system with purified potable water from said fresh water storage tank, and maintaining said entire system filled with said purified potable water during the entire time of shutdown of said system, whereby said purified potable water, due to the low osmotic pressure thereof, forms a medium which is biocidal to and prevents the growth of marine microorganisms within said system.

4,169,790

SOLID SURFACE TEXTURE SUITABLE FOR A STATIONARY PHASE FOR CHROMATOGRAPHY

Victor Pretorius, and Jacobus D. Schieke, both of Pretoria, South Africa, assignors to South African Inventions Development Corporation, Pretoria, South Africa

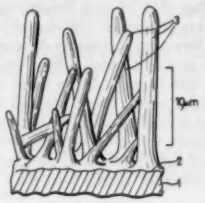
Continuation-in-part of Ser. No. 679,096, Apr. 21, 1976, abandoned. This application Feb. 3, 1978, Ser. No. 875,028

Claims priority, application South Africa, May 2, 1975, 75/2842; May 28, 1975, 75/3444

Int. Cl.[2] B01D *15/08*

U.S. Cl. 210—31 C **36 Claims**

35. In a process for chromatographic separation which comprises subjecting a phase to chromatographic separation between a stationary phase and a moving gas or liquid mixture to effect separation of components, the improvement which comprises using as the stationary phase a surface provided with a



plurality of microvilli projecting into the moving phase from and grown onto the surface.

4,169,791

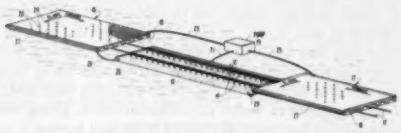
APPARATUS AND PROCESS FOR VOLUME REDUCTION OF AQUEOUS WASTE THROUGH SOLAR EVAPORATION

Victor R. Johnson, Jr., Cob County, Ga., and William O. Hagerman, Memphis, Tenn., assignors to Waste Management, Inc., Oak Brook, Ill.

Filed Sep. 6, 1978, Ser. No. 939,933

Int. Cl.[2] B01D *1/24*

U.S. Cl. 210—71 **17 Claims**



13. A method for volume reduction of aqueous waste comprising the st.ps of:

covering a lagoon containing aqueous waste of which the volume is to be reduced with a cover extending over said lagoon during periods of precipitation, said cover being laterally movable with respect to the surface of said lagoon;

moving said cover to a position adjacent said lagoon during periods of fair weather;

dispersing waste from said lagoon over the upper surface of said cover during said periods of fair weather, said waste dispersed from said lagoon being exposed to the atmosphere upon said upper surface, said waste being dispersed through a plurality of nozzles coupled to said cover and positioned for dispersing said waste upon said upper surface of said cover; and

evaporating off at least some of the water portion of said aqueous waste through solar evaporation thereby concentrating pollutants in said waste.

4,169,792

WATER INTAKE DEVICE

William L. Dovel, 1109 N. Broadway, Yonkers, N.Y. 10701

Filed Oct. 13, 1977, Ser. No. 841,846

Int. Cl.[2] B01D *23/24*

U.S. Cl. 210—82 **17 Claims**

1. A water intake device comprising:

(a) a movable foraminous member adapted to be at least partially submerged in a body of water;

(b) means for moving said foraminous member;

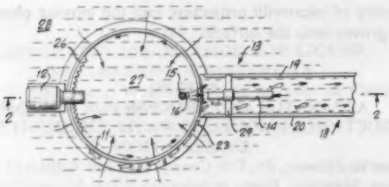
(c) a water supply conduit to receive water flowing through said foraminous member;

(d) backwashing means provided associated with said foraminous member for backwashing a section of said foraminous member as said foraminous member moves past said

backwashing means so as to clear and/or remove objects or fish caught on said foraminous member;

(e) duct means associated with said backwashing means and on the other side of said foraminous member from said backwashing means to remove objects or fish removed from said foraminous member or screen by said backwashing means and to provide a flow channel or path for said objects or fish to move away from said foraminous member, said duct means being adapted to be at least partially submerged in said body of water; and

(f) conduit means of sufficient dimension to provide a stream of water of sufficient force, directed away from said foraminous member within said duct means, to carry said



objects or fish removed by said back washing means away from said foraminous member.

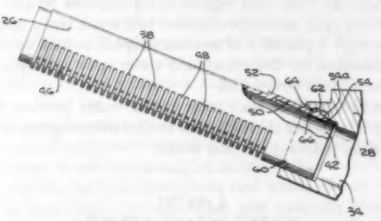
17. In an operation wherein water is taken into a water intake, the water intake being provided with a screen to remove solid material, such as debris and live fish, from the water taken into the intake, the improvement which comprises backwashing said screen to clear solid material, such as debris and live fish and the like, from the screen, moving said solid material cleared from said screen into a path away from said screen and the infuence of the water entering said screen, and directing a stream of water of sufficient force, along said path and onto said solid material cleared from said screen in order to move said material cleared from said screen by said backwashing away from said screen.

4,169,793

TANK DRAIN ASSEMBLY FOR SWIMMING POOL FILTERS

James J. Lockshaw, Huntington Beach, Calif., assignor to Tolo, Incorporated, Santa Ana, Calif.

Filed Jul. 11, 1977, Ser. No. 814,176
Int. Cl.[2] E04H *3/20*; B01D *29/08*
U.S. Cl. 210—169 **8 Claims**



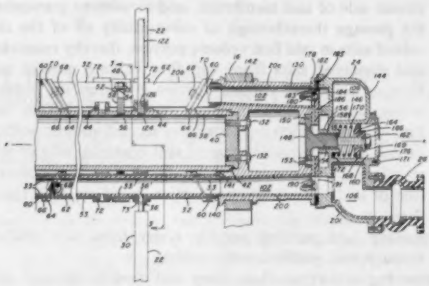
1. In a tank drain assembly for conveying filtered water simultaneously from a plurality of circularly spaced locations in a particulate filtering medium disposed within a swimming pool filter tank and to a common drain port beyond said medium, said assembly comprising a manifold interiorly open to said drain port, and a plurality of circularly distributed collector tubes projecting radially from sockets formed in the wall of said manifold, each said tube having a longitudinally extended series of coplanar apertures therein normally opening downwardly in their operative orientation to communicate said filtering medium locations with said drain port; the improvement of a self-locking and orienting structure cooperatively defined by said tubes and sockets for individually locking said tubes into their respective sockets preferentially in said operative orientation, each said structure comprising spring finger means segmentally formed on the socket end of said tube, and defining an outwardly projecting radial detent at the free end thereof and an inwardly opening finger receiving recess within the tube socket sized to engage said detent snugly against angular and longitudinal movement and located so as to operatively downwardly orient said tube apertures responsive to engagement of said finger means detent in said recess in tube internal self-locking relation.

4,169,794

FILTER

Charles L. Badino, Mexico, Mo., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Mar. 2, 1977, Ser. No. 773,583
Int. Cl.[2] B01D *33/26*
U.S. Cl. 210—330 **6 Claims**



1. In a rotary filter apparatus wherein a shaft portion including fluid flow passageway means is disposed in relative rotary relation with a valve means including fluid flow passageway means in a manner to permit selective fluid flow communication therebetween during such relative rotation, the improvement comprising: at least a pair of seal members including a first seal member releasably carried by such shaft portion and a second seal member releasably carried by such valve means; respective surface portions of said first and second seal members being maintained in continuously slideable face sealing engagement to define a sealed interface therebetween; and said first and second seal members including respective aperture means communicating between said sealed interface and the respective said passageway means in such shaft portion and such valve means to permit fluid flow communication therebetween across said sealed interface by selective registering of the respective said aperture means in said first and second seal members during relative rotation therebetween.

4,169,795

LOW PROFILE FILTER

Kenneth Raines, Bethlehem, Pa., assignor to National Patent Development Corporation, New York, N.Y.

Filed Aug. 12, 1977, Ser. No. 824,236
Int. Cl.[2] C02C *1/14*
U.S. Cl. 210—446 **5 Claims**

1. A low profile filter assembly for IV sets, comprises: a tubular, open-ended elongate housing having an inlet end and an outlet end; a pair of substantially identical, axially aligned, tubular inlet and outlet filter adaptors secured in the inlet and outlet ends, respectively, of the housing, said filter adaptors having aligned fluid passage means defined therein; a substantially conically shaped, submicron filter member having an inlet end and an outlet end connected, respectively, to the inlet and outlet filter adaptors, said filter member inlet end being connected to said inlet adaptor to conduct fluid from said inlet adaptor to said filter member, the inlet end being larger than the outlet end; and lengths of flexible tubing connected to the

inlet and outlet filter adaptors to convey IV fluid to and from the filter assembly; a cap member closing said filter outlet end thereby forcing the IV fluid to exit from said filter member prior to reaching said filter member outlet end so that IV fluid flows from said filter member into said housing, said filter member being attached to said cap member; a slot shaped opening defined in said outlet filter adaptor providing fluid communication between said housing and said outlet adaptor fluid passage; a plurality of supporting ribs extending longitu-

dinally of said housing and supporting said filter member, each of said ribs including an inner portion and an outer portion, said filter member being sandwiched between said rib inner and outer portions; said ribs each being attached at one end to said inlet filter adaptor and at another end to said bypass flow slot via said end cap; a collar attaching said rib one ends to said inlet filter adaptor; said filter assembly having a maximum transverse dimension only about twice as great as the diameter of the tubing.

4,169,796

PROCESSING OF DICALCIUM PHOSPHATE AND SODIUM MONTMORILLONITE

Clarence W. Dahlin, 98 Pine St., Weston, Mass. 02193

Filed Feb. 1, 1978, Ser. No. 874,140
Int. Cl.[2] C09K *3/00*; C04B *31/20*
U.S. Cl. 252—1 **2 Claims**

1. A process for forming a dispersion of dicalcium phosphate in sodium montmorillonite clay comprising:

mixing two parts sodium montmorillonite clay with 1.5 parts dicalcium phosphate and not less than 2.73% distilled demineralized water by weight; and

subjecting the mixture to dry heat in the vicinity of 300° F. until it no longer contains any water.

4,169,797

COMPOSITION FOR ACIDIZING SUBTERRANEAN FORMATIONS

Chester C. Johnston, Jr.; Brent J. Bertus, and James E. Hessert, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 643,985, Dec. 24, 1975, Pat. No. 4,068,720. This application Oct. 27, 1977, Ser. No. 846,060
Int. Cl.[2] E21B *43/27*
U.S. Cl. 252—8.55 C **9 Claims**

1. A gelled acidic composition, suitable for matrix-acidizing or fracture-acidizing of a subterranean formation, comprising:

water;

a water-thickening amount of a water-soluble cellulose ether;

an amount of a water-soluble compound of a polyvalent metal wherein the metal present is capable of being reduced to a lower polyvalent valence state and which is sufficient to cause gelation of an aqueous dispersion of the components of said composition when the valence of at least a portion of said metal is reduced to said lower valence state, said compound being selected from the group consisting of potassium permanganate, sodium permanganate, ammonium chromate, ammonium dichromate, the alkali metal chromates, the alkali metal dichromates and chromium trioxide;

an amount of a water-soluble reducing agent which is effective to reduce at least a portion of said metal to said lower valence state and cause said gelation; and

an amount within the range of from 1 to 12 weight percent, based on the total weight of the composition of a non-oxidizing acid which is capable of reacting with a significant amount of the acid-soluble components of said formation, said non-oxidizing acid being selected from the group consisting of hydrochloric acid, sulfuric acid and mixtures thereof;

said cellulose ether, said polyvalent metal compound, said reducing agent, and said acid, in the amounts used, being sufficiently compatible with each other in an aqueous dispersion thereof to permit said gelation and thus form a said composition having sufficient stability to degeneration by the heat of said formation to permit good penetration of said composition into said formation and the maintenance of said composition in said formation in contact therewith for a period of time sufficient for the acid in said composition to significantly react with the acid-soluble components of said formation and stimulate the production of hydrocarbons therefrom.

4,169,798

WELL-TREATING COMPOSITIONS

Ronald N. DeMartino, Wayne, N.J., assignor to Celanese Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 745,497, Nov. 26, 1976, abandoned. This application Oct. 25, 1977, Ser. No. 845,000
Int. Cl.[2] E21B *43/26*
U.S. Cl. 252—8.55 R **11 Claims**

1. A hydraulic well-treating fluid composition which comprises an aqueous solution containing methyl ether of polygalactomannan gum as a gelling agent, and a breaker additive for reduction of solution viscosity, wherein the methyl ether of polygalactomannan gum has a degree of substitution between about 0.1 and 1.5.

4,169,799

LUBRICATING OIL COMPOSITION

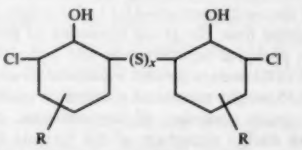
Rodney L. Sung, Fishkill, and Benjamin H. Zoleski, Beacon, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Dec. 27, 1976, Ser. No. 754,658
Int. Cl.[2] C10M *1/54, 3/48, 5/28, 7/52*
U.S. Cl. 252—42.7 **20 Claims**

1. A lubricating oil composition comprising:

A hydrocarbon base oil of lubricating viscosity having an SUS viscosity at 100° F. of between about 50 and 250;

an effective silver anti-wear amount of a mixture of hydroxy, chlorinated, alkylphenyl sulfides of the general formula:

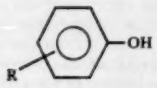


wherein R is, in each instance of its occurrence, one or two alkyl radicals each containing from 4 to 50 carbon atoms, and x is an integer of from 1 to 4, and predominantly 1; and

a sulfurized overbased calcium alkylphenolate having a calcium metal to alkylphenol ratio of at least 2.9:2 a calcium content by weight of the total composition of between 6 and 7.4 percent, and a sulfur content of between 0.5 percent and 12 percent of the total composition;

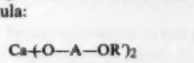
wherein said sulfurized overbased calcium alkylphenolate is produced by the step-wise process that comprises:

(1) introducing into contact with an alkylphenol of the formula:



(I)

wherein R is from 1 to 2 monovalent alkyl radicals, each containing from 4 to 50 carbons, a calcium alkoxyalkoxide of the formula:



(II)

wherein A is an alkanediyl radical from 1 to 6 carbon atoms, and R′ is an alkyl radical of from 1 to 25 carbon atoms, at a temperature between 200° F. and 425° F., utilizing a mole ratio of calcium alkoxyalkoxide to said alkylphenol of from 0.5:1 to 0.6:1;

(2) introducing into contact with the resulting reaction mixture, sulfur in the presence of carbon dioxide at a temperature of from 410° F. to 450° F., utilizing a mole ratio of sulfur to initial alkylphenol of between 0.5:1 and 8:1, and a hydrocarbon lubricating oil, said hydrocarbon oil consistuting between about 13 percent and 20 percent by weight of said reaction mixture; to effect incorporation in said alkylphenolate of from 2 percent to 6 percent by weight of sulfur to form sulfurized alkylphenolate,

(3) forming a third reaction mixture by further introducing into said sulfurized alkylphenolate a further addition of a calcium alkoxyalkoxide of said formula II in the presence of carbon dioxide at a temperature within said first temperature range in a mole ratio of 0.5:1 to 1:1 of said calcium alkoxyalkoxide to initial alkylphenol; and

(4) thereafter hydrolyzing said third reaction mixture, said sulfurized overbased alkylphenolate being employed at a concentration in said lubricating oil composition to give said lubricating oil composition an alkalinity expressed as total base number of at least **10**.

4,169,800

TURBINE LUBRICANT

Harry Dounchis, Gladwyne, Pa., assignor to FMC Corporation, Philadelphia, Pa.

Filed Dec. 2, 1977, Ser. No. 856,867
Int. Cl.[2] C10M *1/46, 3/40, 7/44, 5/24*
U.S. Cl. 252—49.9 **21 Claims**

1. A fire resistant lubricant composition comprising a liquid mixed isopropylphenyl/phenyl phosphate ester base oil and in admixture therewith from about 0.1 to 2.0 weight percent of an amine selected from the group consisting of phenyl-α-naphthylamine, phenyl-β-naphthylamine and diphenylamine; from about 0.01 to 0.1 weight percent benzotriazole and from about 0.005 to 0.25 weight percent of a corrosion inhibitor selected from the group consisting of oleylsarcosine, and a mixed mono- and dialkyl phosphate of the formula RH_2PO_4 and R_2HPO_4, wherein R is an alkyl group of 8–12 carbon atoms.

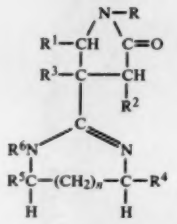
4,169,801

AMINE DERIVATIVES OF LACTAM ACID AND THEIR USE AS LUBRICATING OIL DISPERSANTS

Raymond C. Schlicht, Fishkill, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Filed Dec. 27, 1977, Ser. No. 865,108
Int. Cl.[2] C10M *1/32*
U.S. Cl. 252—51.5 A **63 Claims**

1. A substituted butyrolactam of the formula:



wherein R is a hydrocarbyl radical of from 1 to 12 carbon atoms, an N-mono-or N,N-di-hydrocarbyl substituted aminoalkylidene group wherein each hydrocarbyl moiety contains from 1 to 12 carbon atoms, or an N-butyrolactam radical

R^1 is a hydrocarbyl radical of from 1 to 20 carbon atoms;

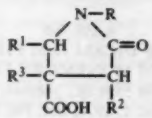
each of R^2 and R^3 is a hydrogen atom or a hydrocarbyl radical of from 1 to 500 carbon atoms, provided that only one of R^2 and R^3 is hydrogen; and only one of R^2 and R^3 is hydrocarbyl;

each of R^4 and R^5 is hydrogen or a hydrocarbyl radical of from 1 to 25 carbon atoms;

R^6 is hydrogen or a hydrocarbyl radical of from 1 to 25 carbon atoms or an amino alkyl or poly (azaalkyl) radical; and

n has a value of 0 to 1 inclusive.

27. A process that comprises reacting a carboxy butyrolactam of the formula:

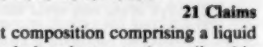


wherein R is a hydrocaarbyl radical of from 1 to 12 carbon atoms, an N-mono-or N,N-di-hydrocarbyl-substituted aminoalkylidene group wherein each hydrocarbyl moiety contains from 1 to 12 carbon atoms; or an N-(3-carboxy-butyrolactam) radica

R^1 is a hydrocarbyl radical of from 1 to 20 carbon atoms; and

each of R^2 and R^3 is a hydrogen atom or a hydrocarbyl radical of from 1 to 500 carbon atoms, provided that only one of R^2 and R^3 is hydrogen, and only one of R^2 and R^3 is hydrocarbyl;

with a polyamine of the formula:

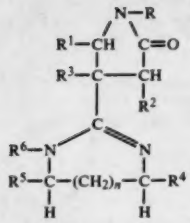


wherein r is an integer of from 2 to 3 inclusive; q is an integer of from 1 to 10, and W is a hydrocarbyl, aminoalkyl or poly(azaalkyl) radical; at a temperature within the range of 25° C. and 250° C.

36. A lubricant oil composition comprising:

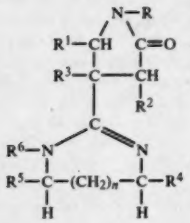
an oil of lubricating viscosity, and

an effective dispersant amount of a butyrolactam of the formula:



wherein R is a hydrocarbyl radical of from 1 to 12 carbon atoms;
an N-mono-or N,N-di-hydrocarbyl substituted aminoalkylidene group wherein each hydrocarbyl moiety contains from 1 to 12 carbon atoms;
or an N-butyrolactam radical
R^1 is a hydrocarbyl radical of from 1 to 20 carbon atoms;
each of R^2 and R^3 is a hydrogen atom or a hydrocarbyl radical of from 1 to 500 carbon atoms, provided that only one of R^2 and R^3 is hydrogen; and only one of R^2 and R^3 is hydrocarbyl;
each of R^4 and R^5 is hydrogen or a hydrocarbyl radical of from 1 to 25 carbon atoms;
R^6 is a hydrocarbyl radical of from 1 to 25 carbon atoms or an amino alkyl or poly(azaalkyl) radical; and
n has a value of 0 to 1 inclusive.

54. A method for operating an engine that comprises supplying to the crankcase thereof a lubricant oil, that comprises an oil of lubricating viscosity and from 0.1 to 10 percent by weight of a butyrolactam of the formula;



wherein R is a hydrcarbyl radical of from 1 to 12 carbon atoms;
an N-mono-or N,N-dihydrocarbyl substituted aminoalkylidene group wherein each hydrocarbyl moiety contains from 1 to 12 carbon atoms;
or an N-butyrolactam radical
R is a hydrocarbyl radical of from 1 to 20 carbon atoms;
each of R^2 and R^3 is a hydrogen atom or a hydrocarbyl radical of from 1 to 500 carbon atoms, provided that only one of R^2 and R^3 is hydrogen; and only one of R^2 and R^3 is hydrocarbyl;
each of R^4 and R^5 is hydrogen or a hydrcarbyl radical of from 1 to 25 carbon atoms;
R^6 is a hydrocarbyl radical of from 1 to 25 carbon atoms, an amino alkyl or polyazaalkyl radical; and
n has a value of 0 to 1 inclusive.

4,169,802

STABILIZED FERROMAGNETIC CHROMIUM DIOXIDE AND PROCESS FOR ITS PREPARATION

Giampiero Basile; Elio Gallinotti, both of Alessandria, and Giancarlo Boero, Asti, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Apr. 4, 1978, Ser. No. 893,348
Claims priority, application Italy, Apr. 7, 1977, 22224 A/77; Feb. 22, 1978, 20508 A/78
Int. Cl.[2] C01G *37/02*
U.S. Cl. 252—62.51 **14 Claims**

1. Stabilized ferromagnetic chromium dioxide particles coated with a stabilizing substance which has been formed in situ on the chromium dioxide particles, said stabilizing substance being present in an amount of from 1 to 25% by weight with respect to the chromium dioxide and selected from the group consisting of polyphosphates of zinc, aluminum or chromium (III) having a high molar ratio of phosphorus/metal and having, depending on the metal, the following formula:

$$P_2O_5.nZnO.mH_2O \quad (1)$$

wherein n is between 0.286 and 0.667 and m is between 0 and 2.570;

$$P_2O_5.nAl_2O_3.mH_2O \quad (2)$$

wherein n is between 0.225 and 0.500 and m is between 0 and 2.68; and

$$P_2O_5.nCr_2O_3.mH_2O \quad (3)$$

wherein n is between 0.143 and 0.333 and m is between 0.002 and 2.46.

6. A process for preparing stabilized ferromagnetic chromium dioxide particles coated with a polyphosphate stabilizing agent according to claim **1**, the process comprising:
(a) providing a dispersion of chromium dioxide particles in water and adding thereto an alkaline orthophosphate and a salt selected from among water soluble salts of zinc, chromium and aluminum;
(b) adding a base selected from among ammonia and alkaline hydroxides in an amount sufficient to adjust the pH of said dispersion to between 5 and 7 in the case of zinc, between 7.5 and 8.5 in the case of aluminum and between 7 and 8 in the case of chromium, to precipitate the corresponding zinc-, aluminum- or chromium orthophosphate onto the chromium dioxide particles;
(c) separating the orthophosphate-coated chromium dioxide particles from the water and contacting them with H_3PO_4 in an amount sufficient to obtain a metal oxide: P_2O_5 ratio, depending on the metal, as follows:
between 0.286 and 0.667 for $ZnO:P_2O_5$
between 0.225 and 0.500 for $Al_2O_3:P_2O_5$
between 0.143 and 0.333 for $Cr_2O_3:P_2O_5$; and
(d) thermally treating the product from step (c) at an elevated temperature between 100° and 350° C. in the case when zinc orthophosphate is the starting material, and between 275° and 350° C. when aluminum orthophosphate or chromium orthophosphate is the starting material, to obtain the desired polyphosphate-coated, stabilized, particulate ferromagnetic chromium dioxide.

4,169,803

FERROMAGNETIC PIEZOELECTRIC CERAMIC COMPOSITION

Yoichi Tanaka, Funabashi; Masamichi Tsuruta; Koji Takahashi, both of Chiba; Tsutomu Hasegawa, Tokyo, and Makoto Hori, Chiba, all of Japan, assignors to TDK Electronic Company, Tokyo, Japan

Continuation of Ser. No. 420,653, Nov. 30, 1973, Pat. No. 4,087,366. This application Sep. 27, 1977, Ser. No. 837,264
The portion of the term of this patent subsequent to May 2, 1995, has been disclaimed.
Int. Cl.[2] C04B 35/46, 35/48, 35/64
U.S. Cl. 252—62.9 5 Claims

1. A piezoelectric ceramic composition prepared by a process, comprising:

individually forming by separately calcining a pyrochlore composite oxide, lead zirconate and lead titanate;

mixing said calcined components with 0.01–3.0 wt.% of MnO_2 relative to the total oxide components in the composition, said pyorchlore composite oxide, lead titanate and lead zirconate being combined in amounts commensurate with the formula:

$$x\left(\begin{matrix}\text{pyrochlore}\\ \text{composite oxide}\end{matrix}\right)\frac{1}{2}\cdot(1-x)$$

wherein said pyrochlore composite oxide is selected from the group consisting of $Cd_2Sb_2O_7$, $Cd_2Nb_2O_7$, $Pb_2Sb_2O_7$, $Pb_2Nb_2O_7$, $Sr_2Sb_2O_7$, $Sr_2Nb_2O_7$, $Ba_2Sb_2O_7$ and $Ba_2Nb_2O_7$, $0.2 \leqq y \leqq 0.8$, $0.2 \leqq z \leqq 0.8$, $0.001 \leqq x \leqq 0.2$ and $Y+z=1.0$; and

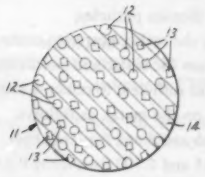
sintering said mixture at a temperature greater than 1000° C.

4,169,804

MAGNETICALLY RESPONSIVE COMPOSITE MICROPARTICLE

Anthony F. Yapel, Jr., Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 715,901, Aug. 19, 1976, abandoned. This application Jun. 20, 1977, Ser. No. 808,334
Int. Cl.[2] A61K 9/50, 9/38; G01N 33/16
U.S. Cl. 252—62.53 18 Claims



1. A magnetically responsive composite microparticle consisting essentially of (i) a magnetically responsive material, and (ii) a water permeable, solid, water-insoluble matrix selected from the group consisting of proteinaceous materials, polysaccharides and mixtures thereof; wherein said magnetically responsive material is dispersed throughout said water-insoluble matrix.

4,169,805

SULFONIC ANHYDRIDES AS PEROXYGEN ACTIVATORS

John H. Blumbergs, Highland Park; Joseph H. Finley, Metuchen, and Burton M. Baum, Princeton, all of N.J., assignors to FMC Corporation, Philadelphia, Pa.

Division of Ser. No. 838,851, Oct. 3, 1977, Pat. No. 4,111,651. This application Apr. 10, 1978, Ser. No. 894,775
Int. Cl.[2] C11D 3/395, 7/54
U.S. Cl. 252—95 4 Claims

1. A bleaching composition consisting essentially of a peroxygen bleaching compound and as a peroxygen activator, an aromatic sulfonic anhydride of the formula:

$$R_1SO_2OSO_2R_2$$

wherein each of R_1 and R_2 is selected from the class consisting of an alkyl radical of 1 to 18 carbon atoms; a cycloalkyl radical of 3 to 7 carbon atoms; a phenyl radical; a naphthyl radical and a heterocyclic radical having 1 ring or 2 fused rings, said ring or rings containing 5 to 6 members of which 1 to 2 are heteroatoms selected from the group consisting of nitrogen, oxygen and sulfur, it being understood that R_1 and R_2 can be identical or different except where they are phenyl or naphthyl in which case R_1 and R_2 are always different.

4,169,806

AGGLOMERATION PROCESS FOR MAKING GRANULAR DETERGENTS

Jerry E. Davis; Frank J. Mueller, and Gerald W. Novosel, all of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Aug. 9, 1978, Ser. No. 932,109
Int. Cl.[2] B01J 2/28, 2/30; C11D 3/075, 11/00
U.S. Cl. 252—99 11 Claims

10. In a process for preparing an agglomerated granular detergent composition comprising by weight on an anhydrous basis at least about 10% sodium tripolyphosphate, from about 50% to about 96% of inorganic materials selected from the group consisting of alkali metal polyphosphates inclusive of the sodium tripolyphosphate, orthophosphates, chlorinated orthophosphates, silicates, carbonates, sulfates, acetates and mixtures thereof and from about 4% to about 20% of an alkoxylated nonionic surfactant, wherein the agglomerating agent is an alkali metal silicate solution having an average SiO_2:M_2O weight ratio of from about 1.6 to about 3.3, M being an alkali metal, the improvement that comprises the addition of one portion of the surfactant to one or more dry ingredients other than a major part of the sodium tripolyphosphate and the addition of another portion of the surfactant to the major part of the sodium tripolyphosphate concurrent with or subsequent to the addition of the agglomerating agent to said sodium tripolyphosphate.

4,169,807

NOVEL SOLVENT DRYING AGENT

John R. Zuber, Piscataway, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 20, 1978, Ser. No. 888,425
Int. Cl.[2] C23G 5/02
U.S. Cl. 252—171 4 Claims

1. An azeotropic mixture of 1-propanol, water and a perfluoro compound selected from the group consisting of perfluoro-2-butyltetrahydrofuran and perfluoro-1,4-dimethylcyclohexane.

4,169,808

HALOORGANOMETALLIC LITHIUM SALT COMPLEX COMPOSITIONS AND ELECTROLYTE COMPOSITIONS CONTAINING THESE

Lawrence P. Klemann, Somerville; Gerald H. Newman, Westfield, and Eugene L. Stogryn, Edison, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Mar. 2, 1978, Ser. No. 882,805
Int. Cl.[2] H01M 6/14, 6/16
U.S. Cl. 252—182.1 39 Claims

1. A composition, comprising one or more haloorganometallic lithium salt complexes having the formula:

$$LiMR_nX_i$$

wherein M is a metal selected from the group consisting of Zn, Cd, B, Al, Ga, In, Tl, Sn (stannous), P and As,
wherein R represents n number of radicals which may be the same or different and which are inertly substituted or otherwise unsubstituted haloorganic radicals selected from the group consisting of haloorganic radicals selected from the group consisting of halogenated alkyl radicals having 2 to 8 carbon atoms, halogenated aryl radicals having 6 to 18 carbon atoms, and halogenated alkaryl and halogenated aralkyl radicals having 7 to 50 carbon atoms, subject to the proviso that the radicals are not alpha halogenated,
wherein X represents i number of radicals which may be the same or different and which are selected from the group consisting of halogens, alkyl radicals having 1 to 8 carbon atoms, aryl radicals having 6 to 18 carbon atoms, and alkaryl and aralkyl radicals having 7 to 50 carbon atoms,
wherein n and i are numerical values which are zero or positive integers, and wherein the sum of n plus i is equal to one plus the valence of the metal M, subject to the provisos that when n is zero, at least one X is an organic radical, and when i is zero, not all R radicals are perhalogenated aryl radicals.

14. An electrolyte composition, comprising:

(a) an organic solvent selected from the group consisting of inertly substituted and unsubstituted ethers, esters, alkylene carbonates, amines, amides, lactones, sulfones, organic sulfites, organic sulfates, orthoformates, alkylhaloformates, polyamines, organic nitro compounds and organic nitrites; and

(b) one or more electrolytically active alkali metal salt complexes including haloorganometallic lithium salt complexes having the formula:

$$LiMR_nX_i$$

wherein M is a metal selected from the group consisting of Zn, Cd, B, Al, Ga, In, Tl, Sn (stannous), P and As,
wherein R represents n number of radicals which may be the same or different and which are inertly substituted or otherwise unsubstituted haloorganic radicals selected from the group consisting of halogenated alkyl radicals having 2 to 8 carbon atoms, halogenated aryl radicals having 6 to 18 carbon atoms, and halogenated alkaryl and halogenated aralkyl radicals having 7 to 50 carbon atoms, subject to the proviso that the radicals are not alpha halogenated,
wherein X represents i number of radicals which may be the same or different and which are selected from the group consisting of halogens, alkyl radicals having 1 to 8 carbon atoms, aryl radicals having 6 to 18 carbon atoms, and alkaryl and aralkyl radicals having 7 to 50 carbon atoms,
wherein n and i are numerical values which are zero or positive integers, and wherein the sum of n plus i is equal to one plus the valence of the metal M, subject to the provisos that when n is zero, at least one X is an organic radical, and when i is zero, not all R radicals are perhalogenated aryl radicals.

4,169,809

EXTRACTIVE PURIFICATION OF CARBOXYLIC ACIDS CONTAINING MONOVALENT AND TRIVALENT THALLIUM CARBOXYLATES

Joseph Pugach, Ho-Ho-Kus, N.J., assignor to Halcon Research & Development Corporation, New York, N.Y.

Filed Apr. 14, 1978, Ser. No. 896,401
Int. Cl.[2] C01F 15/00; C07F 5/00
U.S. Cl. 252—186 8 Claims

1. A process for extractively removing monovalent thallium values from a liquid medium containing a carboxylic acid having limited solubility in water and containing dissolved trivalent thallium values and monovalent thallium values which comprises contacting the carboxylic acid medium with an extractant comprising an acidic aqueous medium to preferentially extract monovalent thallium values into the aqueous medium, and recovering a carboxylic acid raffinate containing trivalent thallium values and depleted in monovalent thallium values.

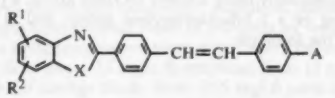
4,169,810

MIXTURES OF OPTICAL BRIGHTENERS

Dieter Gunther, Kelkheim; Rüdiger Erckel, Hofheim am Taunus; Gunter Rösch, Bad Soden, and Heinz Probst, Sulzbach, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

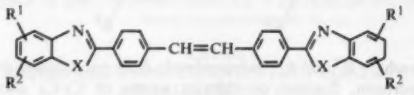
Filed May 8, 1978, Ser. No. 903,606
Claims priority, application Fed. Rep. of Germany, May 11, 1977, 2721084
Int. Cl.[2] C09K 11/06; C11D 7/26; D06L 3/12
U.S. Cl. 252—301.24 4 Claims

1. Mixtures of optical brighteners consisting of from 0.05 to 0.95 part by weight of a compound of the formula I

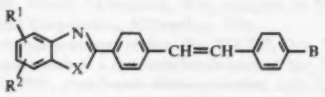


I

and from 0.95 to 0.05 part by weight of a compound of the formulae II or III



II



III

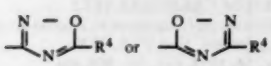
in which formulae the symbols X, R^1, R^2, A and B have the following meanings:

X is an oxygen or sulfur atom;

R^1 and R^2 independently from each other, are identical or different radicals selected from the group of hydrogen, fluorine or chlorine atoms, phenyl, C_1-C_9-alkyl, C_1-C_4-alkoxy, C_1-C_4-dialkylamino, acylamino radicals, or optionally functionally modified carboxy or sulfo groups, two adjacent radicals R^1 and R^2 together optionally representing a benzo ring, a lower alkylene or a 1,3-dioxa-propylene group,

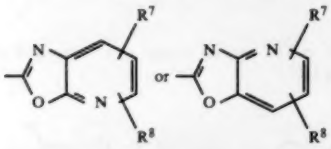
A is cyano, a group of the formulae —$COOR^3$ or —$CONR_2^3$, in which R^3 is hydrogen, alkenyl, C_1-C_{18}-alkyl, cycloalkyl, aryl, alkylaryl, halogenoaryl, aralkyl, alkoxyalkyl, halogenoalkyl, hydroxy-alkyl, alkylaminoalkyl, carboxyalkyl or carboalkoxyalkyl, or two alkyl or alkenyl radicals having the meaning of R^3, together with

the nitrogen atom, may form a morpholine, piperidine or piperazine ring; or A is a group of the formulae

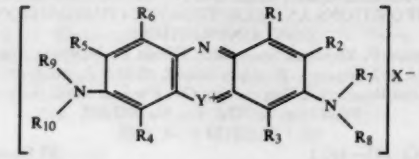


in which R^4 is a linear or branched alkyl group having from 1 to 18 carbon atoms, preferably 1 to 6 carbon atoms, optionally substituted by hydroxy groups, halogen atoms, lower alkoxy, dialkylamino, lower alkylmercapto, chloroaryloxy, aryloxy, arylmercapto or aryl radicals; in the case of the dialkylamino-alkyl groups the two alkyl groups optionally forming together a morholine, piperidine or piperazine ring; or R^4 is a group of the formula $-(CH_2CH_2O)_n-R$, in which n is 1, 2 or 3 and R is H, lower alkyl, dialkylamino-alkoxyalkyl or alkylthio-alkoxyalkyl, the alkyl groups in the dialkylamino-alkoxyalkyl optionally forming together a piperidine, pyrrolidine, hexamethylene-imine, morpholine, or piperazine ring; or R^4 is a group of the formula $-(CH_2)_m-CH=CH-R$ (m is an integer of from 0 to 5), or a radical of the formula:

in which R^5 and R^6, being identical or different, each are radicals selected from the group of hydrogen, fluorine or chlorine atoms, phenyl, lower alkyl, lower alkoxy, (C_1-C_4)-acylamino groups, or optionally modified fied carboxy or sulfo groups; two adjacent radicals R^5 and R^6 together optionally being a lower alkylene group, a fused benzo ring or a 1,3-dioxapropylene group; and B is a group of the formulae

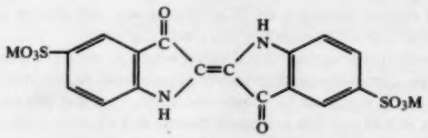


in which R^7 and R^8, independently from each other, are hydrogen, fluorine or chlorine atoms or C_1-C_4 alkyl groups.



wherein $-Y^+$ is selected from the group consisting of $-O^+-$, $-S^+=$ and

wherein Z is selected from the group consisting of hydrogen, an alkyl group having 1–4 carbon atoms and an aryl group having 6–7 carbon atoms; each of R_1–R_6 is independently selected from the group consisting of hydrogen, an alkyl group having 1–4 carbon atoms, an alkoxy group having 1–4 carbon atoms and a nitro group; each of R_7–R_{10} is independently selected from the group consisting of hydrogen and an alkyl group having 1–4 carbon atoms; and X is halogen; compounds represented by the formula



wherein M is an alkali metal; and mixtures thereof; (b) at least one alkaline material selected from the group consisting of oxides and hydroxides of alkaline earth metals; aluminum hydroxide; phosphates, carbonates, and organic acid salts of alkaline earth metals and mixtures thereof; and (c) at least one reducing agent selected from the group consisting of dithionites, ferrous compounds, reducing saccharides and mixtures thereof.

4,169,811

OXYGEN INDICATOR

Yoshio Yoshikawa, Ushiku; Takanari Nawata, Tokyo; Mikio Goto, Matsudo, and Yuichi Fujii, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Co., Inc., Tokyo, Japan

Filed Mar. 15, 1978, Ser. No. 886,638

Claims priority, application Japan, Mar. 23, 1977, 52-31730; Mar. 29, 1977, 52-35016; Nov. 16, 1977, 52-137507

Int. Cl.[2] **C09K** *3/00;* **G01N** *21/12, 33/00*

U.S. Cl. 252—408 **23 Claims**

1. A solid state oxygen color-change indicator for indicating the presence or absence of oxygen in gas comprising a solid mixture of

(a) at least one dyestuff selected from the group consisting of compounds represented by the formula

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4,169,812

REGENERATION OF SCALE-COATED ACTIVATED CARBON WITH ACID WASH

David W. Smith, East Windsor, N.J., and Marinus J. Baadsgaard, Henderson, Nev., assignors to FMC Corporation, Philadelphia, Pa.

Filed Mar. 7, 1978, Ser. No. 884,108

Int. Cl.[2] **B01J** *21/20;* **C01D** *7/26;* **B01D** *15/06*

U.S. Cl. 252—415 **14 Claims**

1. A method for regenerating scale-coated activated carbon used to treat sodium carbonate solutions which comprises

washing the scale-coated carbon with an aqueous acid wash solution containing from 1 to 15% by weight HCl and from 0.5 to 3% by weight NH_4HF_2, provided that the weight ratio of HCl to NH_4HF_2 in the solution is at least 1.

4,169,813

ACIDIC MULTIMETALLIC CATALYTIC COMPOSITE

John C. Hayes, Palatine, Ill., assignor to UOP Inc., Des Plaines, Ill.

Division of Ser. No. 773,021, Feb. 28, 1977, Pat. No. 4,098,679, which is a continuation-in-part of Ser. No. 663,417, Mar. 3, 1976, abandoned, which is a division of Ser. No. 475,691, Jun. 3, 1974, Pat. No. 3,960,709, which is a continuation-in-part of Ser. No. 391,428, Aug. 24, 1973, abandoned, which is a division of Ser. No. 225,634, Feb. 11, 1972, Pat. No. 3,775,301, which is a division of Ser. No. 839,086, Jul. 3, 1969, abandoned. This application Mar. 13, 1978, Ser. No. 886,327

The portion of the term of this patent subsequent to Nov. 2, 1988, has been disclaimed.

Int. Cl.[2] B01J *27/08, 27/10*

U.S. Cl. 252—441 7 Claims

1. An acidic catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.01 to about 2 wt. % rhenium, about 0.01 to about 5 wt. % germanium, and about 0.1 to about 3.5 wt. % halogen; wherein the platinum or palladium, rhodium, rhenium, and germanium are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum or palladium, rhenium and rhodium are present in the elemental metallic state; and wherein substantially all of the germanium is present in an oxidation state above that of the elemental metal.

4,169,814

PROCESS FOR PRODUCING CATALYSTS COMPRISING A CARRIER IMPREGNATED WITH A SOLUTION OF CHLOROPLATINIC ACID AND BARIUM HYDROXIDE FOR DECOMPOSING AMMONIA BY OXIDATION

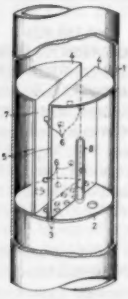
Hideya Inaba; Yasumi Kamino; Shigenori Onizuka, and Chikashi Inazumi, all of Osaka, Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed Feb. 3, 1978, Ser. No. 875,087

Claims priority, application Japan, Jan. 13, 1978, 53-2901

Int. Cl.[2] B01J *27/10, 23/58, 23/64;* C01C *3/00*

U.S. Cl. 252—441 12 Claims



1. A process for producing a catalyst for decomposing NH_3 by oxidation comprising the steps of converting the surface layer of steel material of specified shape resembling a ring, honeycomb or plate to an aluminum alloy, treating the steel material with an aluminum dissolving solution to dissolve out the aluminum and to render the surface layer porous, subjecting the resulting steel material to oxidation treatment to obtain a catalyst carrier, immersing the carrier in a solution of chloroplatinic acid adjusted to weak alkalinity with barium hydroxide, and drying the carrier after withdrawing the carrier from the solution.

4,169,815

CATALYST FOR DEHYDROGENATION PROCESS

Lewis E. Drehman, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 570,886, Apr. 23, 1975, abandoned, which is a division of Ser. No. 415,944, Nov. 15, 1973, Pat. No. 3,894,110. This application Sep. 27, 1978, Ser. No. 946,232

Int. Cl.[2] B01J *21/04, 21/08, 23/62, 23/82*

U.S. Cl. 252—466 PT 6 Claims

1. A catalyst composition suitable for the dehydrogenation of a dehydrogenatable organic compound having from 2 to 12 carbon atoms per molecule in the presence of steam and in the absence of free oxygen consisting essentially of:

(a) from about 0.1 to about 5 weight percent of a metal selected from the group consisting of nickel, palladium, platinum, iridium, osmium and mixtures thereof;

(b) from about 0.01 to about 5 weight percent of tin; and

(c) from about 0.1 to about 5 weight percent of thallium, each of said (a), (b) and (c) being supported on a support selected from the group consisting of alumina, silica, magnesia, zirconia, alumino-silicate, Group II aluminate spinels and mixtures thereof wherein the mol ratio of said metal (a) to said tin is in the range of 10:1 to 1:10 and the ratio of said metal (a) to said thallium is in the range of 10:1 to 1:10.

4,169,816

ELECTRICALLY CONDUCTIVE POLYOLEFIN COMPOSITIONS

Hsue C. Tsien, Chatham, N.J., assignor to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Mar. 6, 1978, Ser. No. 883,902

Int. Cl.[2] H01B *1/06, 1/08*

U.S. Cl. 252—511 13 Claims

1. An electrically conductive polyolefin composition comprising a homogeneous blend of 100 parts by weight of a crystalline polypropylene-ethylene copolymer containing from 20 mole % to about 35 mole % ethylene; from 15 to 30 parts by weight of carbon black; from 0.25 to 1.0 parts by weight of silica; and from 1 to 10 parts by weight of a fiber-reinforcing agent selected from carbon fibers and mixtures of carbon and glass fibers, and when said fiber agent is a mixture of carbon and glass fibers, then said composition shall contain from 1 to 5 parts of glass fibers and from 1 to 5 parts of carbon fibers.

4,169,817

LIQUID CLEANING COMPOSITION CONTAINING STABILIZED ENZYMES

Meyer M. Weber, Milwaukee, Wis., assignor to Midwest Biochemical Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 211,755, Dec. 23, 1971, abandoned, which is a continuation-in-part of Ser. No. 852,079, Aug. 21, 1969, abandoned. This application Apr. 8, 1974, Ser. No. 458,819

Disclosure was also published under second Trial Voluntary Protest Program on Apr. 13, 1976

Int. Cl.[2] C11D *7/42*

U.S. Cl. 252—545 16 Claims

1. An aqueous cleaning composition containing stabilized enzymes enabling the composition to be stored for extended periods without appreciable deactivation of the enzymes, comprising an aqueous solution containing 10% to 50% by weight of solids and having a pH in the range of 7.0 to 11.0 and consisting essentially by weight of (a) 2% to 25% of an ionic detergent builder selected from the group consisting of water soluble inorganic phosphates, nitrilotriacetic acid, water soluble alkali metal salts of nitrilotriacetic acid, ethylene diamine tetra acetic acid, water soluble alkali metal salts of ethylene diamine tetra acetic acid, and the combination of an alkali metal metasilicate and an alkali metal carbonate, (b) 5% to 30% by weight of a water-soluble surface active agent selected from the group consisting of an alkali metal alkyl sulfate where the alkyl group

contains from 10 to 18 carbon atoms, an alkali metal alkylol sarcosinate where the alkylol group contains from 11 to 18 carbon atoms, an acetylenic glycol, an alkyl aryl sulfonate where the alkyl group contains from 8 to 15 carbon atoms, a fatty acid alkanolamide where the acyl radical has from 10 to 18 carbon atoms, and mixtures thereof, (c) 0.1% to 5% by weight of a water-soluble alkaline protease, (d) 5% to 40% by weight of an enzyme stabilizing agent selected from the group consisting of alkali metal sulfates, alkali metal chlorides, glycerol and alkylene glycols having from 2 to 8 carbon atoms in the alkylene group, and (e) the balance water.

7. A cold water wash composition, having a pH of about 7.0 and consisting essentially by weight of: 1% of the sodium salt of ethylene diamine tetraacetic acid, 6% of sodium lauryl sulfate, 6% sodium lauryl ether sulfate, 1.5% alkylamide sulfo succinate amid salt, 2% soluble alkaline protease having an activity from about 4000 to about 6000 Delft units/gm., 20% propylene glycol, 1.5% cocoaamido propyl dimethyl amine oxide, 0.5% polypeptides, 1.5% of an additive selected from the group consisting of perfume, sodium chloride, and citric acid, and 60% water, said composition having a cleaning performance differential up to 65.

4,169,818

MIXTURE OF HYDROXYPROPYLCELLULOSE AND POLY(MALEIC ANHYDRIDE/ALKYL VINYL ETHER) AS A HYDROCOLLOID GELLING AGENT

Ronald N. DeMartino, Wayne, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Apr. 17, 1978, Ser. No. 896,878
Int. Cl.[2] C08L *1/28*
U.S. Cl. 260—17 R **13 Claims**

1. A hydraulic fluid composition which comprises an aqueous solution containing (1) between about 0.05 and 5 weight percent, based on the weight of water, of a mixture of hydroxypropylcellulose (average M.S. between about 2 and 5) and maleic anhydride/alkyl vinyl ether copolymer as a gelling agent, wherein the alkyl group of the alkyl vinyl ether contains between 1 and about 10 carbon atoms, the gelling agent components are in a relative ratio between about 95:5 and 5:95 weight percent, and the specific viscosity of the copolymer component is between about 0.1 and 10; and (2) between about 0.01 and 25 weight percent, based on the weight of gelling agent, of a breaker additive for subsequent reduction of solution viscosity.

4,169,819

STABILIZED CHLORINE-CONTAINING RESIN COMPOSITION

Tomoo Shiohara, Kyoto, and Mikihiko Horioka, Kobe, both of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 18, 1978, Ser. No. 897,609
Claims priority, application Japan, Apr. 18, 1977, 52-45035
Int. Cl.[2] C08K *5/12, 5/11, 5/10*
U.S. Cl. 260—23 XA **14 Claims**

1. A stabilized chlorine-containing resin composition consisting essentially of a chlorine-containing resin selected from the group consisting of polyvinyl chloride, polyvinylidene chloride, a vinyl chloride-vinylidene chloride copolymer, a copolymer of vinyl chloride or vinylidene chloride as a main monomer unit with ethylene, vinyl acetate, an acrylic acid ester or acrylonitrile, chlorinated polyvinyl chloride, and chlorinated polyethylene and, as a stabilizer, a melted then solidified mixture having a melting temperature of about 50° to about 180° C. of at least one polyhydric alcohol which has two or more hydroxyl groups and 15 or less carbon atoms in its molecule and at least one ester derivative of a polyhydric alcohol which is the esterification reaction product between the hydroxyl groups of a polyhydric alcohol which has two or more hydroxyl groups and 15 or less carbon atoms in its molecule and one or more organic carboxylic acids which can react with the hydroxyl groups of said polyhydric alcohol to form said ester derivative.

4,169,820

ELASTOMERIC COMPOSITIONS

Jan Bock, Houston, Tex.; Robert D. Lundberg, Bridgewater, and Henry S. Makowski, Scotch Plains, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Nov. 29, 1977, Ser. No. 855,757
Int. Cl.[2] C08L *91/00*
U.S. Cl. 260—23.5 A **27 Claims**

1. An elastomeric composition having a viscosity at 0.73 sec^{-1} at 200° C. of about 8×10^4 to about 8×10^5 poises, said composition formable by extrusion or injection molding into an elastomeric article, which consists essentially of:

(a) a neutralized sulfonated elastomeric polymer having a viscosity at 0.73 sec^{-1} at 200° C. of about 3×10^5 poises to about 5×10^6 poises and about 15 to about 50 meq. neutralized sulfonate groups per 100 grams of said neutralized sulfonated elastomeric polymer;

(b) about 25 to about 150 parts by weight of a non-polar process oil per 100 parts of said neutralized sulfonated elastomeric polymer, said non-polar process oil having less than about 2 wt. % polar type compounds therein;

(c) about 50 to about 300 parts by weight of an inorganic filler per 100 parts of said neutralized sulfonated elastomeric polymer, said inorganic filler being selected from the group consisting of clay, talc, and calcium carbonate and mixtures thereof, a ratio of said inorganic filler to said non-polar process oil being about 1.25 to about 4.0; and

(d) at least 8 parts by weight of a preferential ionic plasticizer per 100 parts of said neutralized sulfonated elastomeric polymer, said preferential plasticizer having a melting point of at least 25° C. and is selected from the group consisting of carboxylic acids having about 5 to about 30 carbon atoms and salts of said carboxylic acids and mixtures thereof, an ion of said salt being selected from the group consisting of aluminum, ammonium, lead, Cd, Hg, and Groups IA, IIA and IB of the Periodic Table of Elements.

4,169,821

MODIFIED HYDROCARBON RESIN COMPOSITION FOR USE IN PRINTING INK

Gerhard Werner, Glashütten; Hans-Jürgen Tietz, Langenhain; Reinhard Wagner, Naurod, and Wolfgang Dathe, Auringen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 483,418, Jun. 26, 1974, abandoned. This application Jun. 24, 1977, Ser. No. 809,798
Int. Cl.[2] C08F *8/10, 8/14, 255/00*; C09D *11/10*
U.S. Cl. 260—27 BB **12 Claims**

1. A resin for use as a binder in a non-aqueous printing ink which comprises a salt-free modified hydrocarbon resin based on monomers of unsaturated hydrocarbon fractions having a boiling range between 20° and 230° C. and containing at least 70% by weight of monoolefins including between 15 and 30% by weight of indenes and up to 30% by weight of diolefins said percentages being based on the total of the polymerisable monomers, and said hydrocarbon resin containing adducted thereto at most dibasic carboxylic acid units with 3 to 15 carbon atoms, the carboxylic groups of which are partially esterified with a polyhydric alcohol having 2 to 20 carbon atoms in such an amount that the modified hydrocarbon resin product contains from 0.01 to 0.7 ester groups of polyhydric alcohol based on each acid group originally present and said compositions has a melting point of at least about 130° C.

4,169,822

HOT MELT SEALANTS

Edward F. Kutch, Trenton, N.J.; Robert M. Meyers, Fairless Hills, Pa., and Matthew M. Sitter, Convent Station, N.J., assignors to The Norton Company, Worchester, Mass.

Continuation-in-part of Ser. No. 626,695, Oct. 29, 1975, and a continuation-in-part of Ser. No. 626,696, Oct. 29, 1975, which is a continuation-in-part of Ser. No. 460,332, Apr. 12, 1974, Pat. No. 3,932,341, which is a continuation of Ser. No. 256,928, May 25, 1972, abandoned. This application May 13, 1977, Ser. No. 796,561

Int. Cl.[2] C08L *93/00*

U.S. Cl. 260—27 BB **10 Claims**

1. Solvent-free, hot-melt compositions adapted to be extruded for use as sealants, adhesives, caulking compounds, expansion joints and the like consisting essentially of an unreacted mechanical mixture of 100 parts by weight of a polymerized elastomeric compound having a molecular weight above about 15,000 and selected from the group consisting of polyisobutylene, butadiene-styrene, styrene-butadiene-styrene polymers, styrene-isoprene polymers, chlorinated rubbers, acrylic rubber and mixtures thereof, with from about 1 to 400 parts by weight of tackifying resins selected from the group consisting of terpene resins, polyterpene resins, phenolic resins, hydrogenated rosin, hydrocarbon resins and mixtures thereof; from about 15 to 600 parts by weight of plasticizers selected from the group consisting of polybutenes, low molecular weight polyisobutylenes, phosphate esters, dibutyl phthalate, straight chain aliphatic acid esters, paraffin oils, coal tars, asphalts, chlorinated polyphenyl, chlorinated biphenyl and mixtures thereof; from about 0.5 to 60 parts by weight of adhesion promoter comprising the combination of an eopxy resin and an organic silane which is non-reactive with the epoxy resin, and from about 5 to 1000 parts by weight of an inert filler material; said composition being readily extrudable at temperatures above about 150° F. while hardening upon cooling without undergoing chemical change, and having a hardness of about 5 to 95 on a Shore A Durometer at room temperature.

4,169,823

COATING COMPOSITION COMPRISING AN AQUEOUS EMULSION OF POLYETHYLENE CONTAINING A WATER-SOLUBLE POLYETHYLENE OXIDE

James C. Jones, Maumee, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Jun. 14, 1978, Ser. No. 915,622

Int. Cl.[2] C08L *23/06*

U.S. Cl. 260—29.6 NR **12 Claims**

1. A coating composition for a substrate adapted to improve the scuff resistance of the substrate, said composition comprising an aqueous emulsion of a polyethylene containing from about 0.5% to about 15% of a homopolymer consisting essentially of a water-soluble polyethylene oxide by weight of said polyethylene emulsion, said polyethylene oxide prior to dissolution in said aqueous emulsion having an average molecular weight of about 100,000 to a molecular weight at which the polyethylene oxide is no longer water soluble, said polyethylene and polyethylene oxide being adapted to be co-deposited from said aqueous emulsion jointly to form a coating on such substrate having improved scuff resistance.

4,169,824

RED MUD TREATMENT

James Kane, Olympia Fields, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Continuation-in-part of Ser. No. 882,680, Mar. 2, 1978, abandoned, which is a continuation-in-part of Ser. No. 808,770, Jun. 22, 1977, abandoned. This application Jun. 5, 1978, Ser. No. 911,027

Int. Cl.[2] C08L *33/02*

U.S. Cl. 260—29.6 M **2 Claims**

1. A method of fluidizing a flocculated red mud plastic mass which comprises uniformly admixing with the flocculated red mud plastic mass at least 0.10 pound per metric ton of an acrylic acid polymer as polymer based upon the dry weight of the red mud, said polymer having a molecular weight within the range of 5,000–30,000.

4,169,825

HIGH SOLIDS COATING COMPOSITIONS

William J. Yapp, Park Forest, and Robert E. McDonald, Calumet City, both of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed May 15, 1975, Ser. No. 577,830

Int. Cl.[2] C08K *5/10*; C08L *61/00, 63/10*

U.S. Cl. 260—31.6 **3 Claims**

1. A high solids coating composition having a solids content of at least about 80% by weight comprising from about 50 to 80 parts by weight of a polyester, about 10 to 40 parts by weight of at least one crosslinking agent selected from the class consisting of capped isocyanates, condensation products of an aldehyde with melamine, condensation products of an aldehyde with urea, condensation products of an aldehyde with guanamine, and said condensation products alkylated with alcohols having 1 to 4 carbons, about 2.0 to 10 parts by weight of an epoxy resin, a copolymer, and up to about 5.0 parts by weight of an acid catalyst wherein the polyester has an average molecular weight ranging from about 200 to 1000 and has a hydroxyl content of 4.0 to 10% by weight and the copolymer is present in an amount ranging from about 2.0 to 8.0 parts by weight and is obtained by copolymerizing styrene with a hydroxyalkyl acrylate.

4,169,826

PROCESSES FOR DISPERSING INORGANIC ADDITIVES IN THERMOPLASTIC POLYMERS

Ronald E. Gilbert, Katy; Thomas J. Lynch, Houston, and Robert J. Rowatt, Orange, all of Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Jun. 12, 1978, Ser. No. 914,306

Int. Cl.[2] C08K *5/01*

U.S. Cl. 260—33.6 PQ **7 Claims**

1. In a process in which finely-divided solid inorganic additive is incorporated into and dispersed in a thermoplastic polymer by comalaxation at a temperature above the softening temperature of the polymer; the improvement which consists essentially of admixing with said thermoplastic polymer a Bingham fluid composition and comalaxating said mixture, said Bingham fluid composition being a solid at ambient temperature and capable of flow under an applied pressure, the continuous solid phase of the Bingham fluid composition being an intimate dispersion of a finely-divided inorganic solid additive in a liquid hydrocarbon, said inorganic additive being selected from the group consisting of carbon black, titanium dioxide, talc, diatomaceous earth and siliceous materials having a substantial quantity of hydroxyl groups chemically bonded to silicon atoms.

4,169,827

FLAME RESISTANT AND SELF-EXTINGUISHING POLYMER COMPOSITIONS

Klaus Gerlach, Obernau, and Wolfgang Lange, Obernburg, both of Fed. Rep. of Germany, assignors to Akzona Incorporated, Asheville, N.C.

Continuation-in-part of Ser. No. 743,242, Nov. 19, 1976, abandoned. This application Mar. 3, 1977, Ser. No. 774,073

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1975, 2628902; Jun. 28, 1976, 2628964; Jun. 28, 1976, 2552511

Int. Cl.[2] C08K *5/09*

U.S. Cl. 260—45.75 R **16 Claims**

1. A flame resistant polyester, polyamide, polyolefin, polyacrylate or epoxy resin molding compound having incorporated therein a flame retardant amount of an additive having the following general formula:

$Me_k^I Me_m^{II}[Z(C_2O_4)_n]$

wherein Me^I represents Li, Na, K, Rb, Cs, or NH_4, Me^{II} represents one of the aforementioned cations or Ba; Z represents one of the central atoms Mg, Ba, Zr, Fe, Co, Cu, Zn, Al, Sn, Cr, and Sb and $K \approx 0$, 1, 2, 3, or 4, $m \approx 0$ or 1 and $n \approx 2$, 3, or 4, provided that k and m are not, simultaneously, zero.

4,169,828
BEAD SIZE DISTRIBUTION IN THE SUSPENSION POLYMERIZATION OF VINYL AROMATIC MONOMERS

Harold A. Wright, Murrysville, Pa., assignor to Arco Polymers, Inc., Philadelphia, Pa.

Filed Dec. 27, 1977, Ser. No. 864,188
Int. Cl.[2] C08F *12/04, 12/08, 12/18, 279/02*
U.S. Cl. 525—264 **7 Claims**

1. In a process for producing polymer beads by suspending a vinyl aromatic monomer selected from the group consisting of styrene, alphamethylstyrene, monochlorostyrene and dichlorostyrene containing a monomer-soluble, free-radical producing catalyst in an aqueous medium with the aid of from 0.1 to 2.0 percent by weight based on monomer of a finely divided, difficultly water-soluble phosphate suspending agent and a bisulfite or persulfate modifier and subjecting the suspension to an elevated temperature to cause said monomer to polymerize, the improvement for producing a narrow distribution of bead diameter sizes which comprises adding to said suspension at least 0.01 percent by weight based on monomer of an adjunct modifier selected from the group consisting of glycine, β-alanine, N,N-bis-(2-hydroxyethyl) glycine, and N-tris-(hydroxymethyl) methyl glycine.

4,169,829
PROCESS FOR THE PREPARATION OF PURIFIED ALBUMIN AND ALBUMIN OBTAINED BY SAID PROCESS

Robert Plan, Lyons; Jacques Liautaud, Limonest; Marie-France Makula, Lyons; Paule Gattel, Caluire; Jean Pla, Sainte-Foy-lés-Lyon, and André Debrus, Lyons, all of France, assignors to Institut Merieux, Paris, France

Continuation of Ser. No. 376,202, Jul. 3, 1973, abandoned. This application Sep. 30, 1977, Ser. No. 838,054
Claims priority, application France, Jul. 5, 1972, 72.24310
Int. Cl.[2] C07G *7/00*
U.S. Cl. 260—122 **16 Claims**

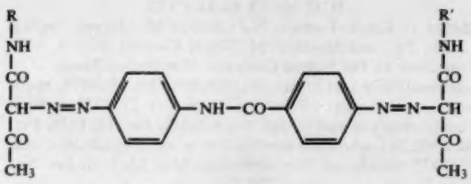
1. A process for preparing purified human albumin essentially free of group substances and alkaline phosphatases from a starting impure albumin solution obtained from placental blood or hemolyzed venous blood from which solution hemoglobins and globulins have been eliminated, which comprises adding ethanol to said impure albumin solution in an amount sufficient so that the ethanol concentration is greater than 55%, adding trichloroacetic acid to said ethanol-containing solution in an amount sufficient so that the concentration therein is from 5×10^{-2} to 8×10^{-2} M/liter and adjusting the temperature to lower than 0° C. whereby a precipitate containing said group substances and alkaline phosphatases is formed and removing the thus formed precipitate.

4,169,830
DIAMINO-BENZANILIDE DISAZO COLORING AGENTS

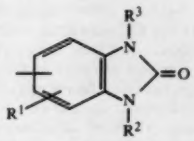
Klaus Hunger, Kelkheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 10, 1977, Ser. No. 850,464
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1976, 2651919
Int. Cl.[2] C09B *33/12;* **D06P** *1/04, 1/44*
U.S. Cl. 260—157 **8 Claims**

1. A compound of the formula



in which R and R′, which are the same or different, are



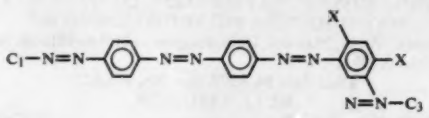
wherein R^1 is hydrogen, chlorine, bromine, methyl or methoxy and one of the substituents R^2 and R^3 is hydrogen and the other is hydrogen, methyl or ethyl.

4,169,831
WATER-SOLUBLE TETRAKISAZO DYESTUFFS DERIVED FROM 4,4′-DIAMINOAZOBENZENE

Pierre Frank, and Andre L. Sailer, both of Saint Clair du Rhone, France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Division of Ser. No. 569,729, Apr. 21, 1975, Pat. No. 4,081,437. This application Nov. 14, 1977, Ser. No. 851,312
Claims priority, application France, Apr. 25, 1974, 74 14388
Int. Cl.[2] C09B *31/24, 31/26, 31/30;* **D06P** *3/32*
U.S. Cl. 260—159 **4 Claims**

1. Dyestuff of the formula:



wherein

C_1 is selected from the group consisting of
ethyl-acetylacetate-2 yl;
1-phenyl-3-methyl-4-yl-5-pyrazolone, in which the benzene nucleus is substituted by a sulphonic acid group in the 3′ or 4′ position or by two sulphonic acid groups in the 2′, 5′ positions and by from 0 to 2 chlorine atoms;
1-(4′-sulphophenyl)-4-yl-3-carboxy-5-pyrazolone;
acetoacetanilide-2-yl;
phenol-yl;
1,3-dihydroxybenzene-yl;
1,3-diaminobenzene-yl;
2,4-diaminotoluene-yl; and
1-aminonaphthalene-yl-6- or 7-sulpho;

C_3 is a phenyl substituted by one sulphonic acid group in the 3 or 4 position or by two sulphonic acid groups in the 2,5-positions or by one sulphonic acid group in the 2- and one methyl in the 4-positions or by one sulphonic acid group in the 5- and one chloro in the 2-positions;

X is OH or NH_2;

each of the residues C_1 and C_3 having at least one and at most two sulphonic acid groups;

C_1 is a residue of a coupling component C_1H and C_3 is a residue of a diazotisable amine C_3NH_2.

4,169,832

DISAZO AND TRISAZO INTERMEDIATES FOR POLYAZO DYES CONTAINING A STILBENYL OR 2,2'-DISULFOSTILBENYL RADICAL

Heinz Wicki, Basel, Switzerland, and Claude Vogel, Saint-Louis, France, assignors to Sandoz Ltd., Basel, Switzerland

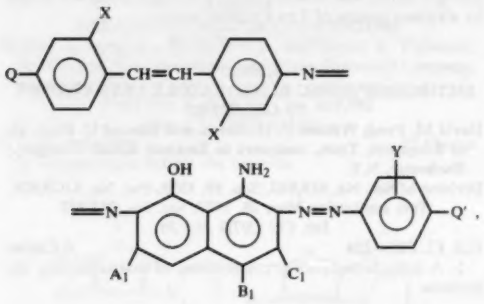
Continuation-in-part of Ser. No. 717,522, Aug. 25, 1976. This application Mar. 13, 1978, Ser. No. 885,627

Claims priority, application Switzerland, Sep. 5, 1975, 11590/75

Int. Cl.[2] C09B *33/10, 33/12, 33/16, 33/18*

U.S. Cl. 260—169 12 Claims

1. A compound of the formula



wherein

each of A_1, B_1 and C_1 is independently hydrogen or $-SO_3M$, with the proviso that when A_1 is $-SO_3M$, one of B_1 and C_1 is $-SO_3M$ and the other is hydrogen and when A_1 is hydrogen, B_1 is $-SO_3M$ and C_1 is hydrogen,

Q is $-NH_2$, $-NO_2$, acylamino or $K_3-N=N-$,

wherein K_3 is a coupling component radical free of diazotizable amino groups,

Q' is $-NH_2-NO_2$, acylamino or $-N=N-K_4$,

wherein K_4 is a coupling component radical free of diazotizable amino groups,

each X is hydrogen or $-SO_3M$, with the proviso that the two X's are the same,

Y is hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, hydroxy, fluoro, chloro, bromo, —COOM or $-SO_3M$, and

each M is hydrogen or a non-chromophoric cation, with the proviso that when Q is $K_3-N=N-$, Q' is $-NH_2$ or acylamino.

4,169,833

NOVEL PHOSPHORANE INTERMEDIATES FOR USE IN PREPARING PENEM ANTIBIOTICS

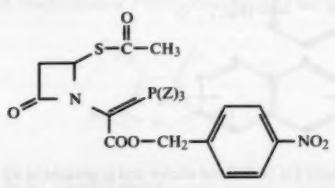
Marcel Menard, Candiac, and Gilles Caron, Brossard, both of Canada, assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 860,351, Dec. 14, 1977, Pat. No. 4,155,912. This application Oct. 4, 1978, Ser. No. 948,615

Int. Cl.[2] C07D *205/08*

U.S. Cl. 260—239 A 2 Claims

1. A compound having the formula



wherein Z is phenyl or C_1-C_6 alkyl.

4,169,834

RIFAMYCIN DERIVATIVES

Renato Cricchio, Varese, Italy, assignor to Gruppo Lepetit S.p.A., Milan, Italy

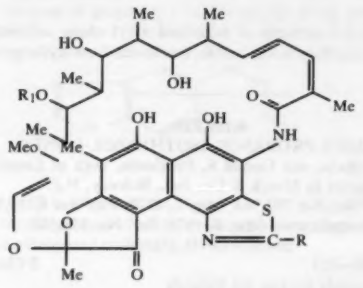
Filed Mar. 22, 1978, Ser. No. 888,890

Claims priority, application United Kingdom, Apr. 20, 1977, 16333/77

Int. Cl.[2] C07D *513/18*

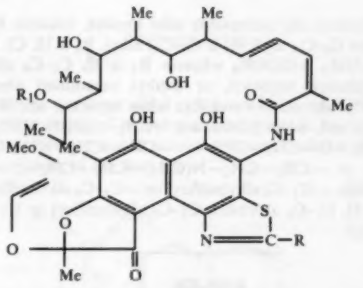
U.S. Cl. 260—239.3 P 11 Claims

1. A process for preparing a 4-deoxy-thiazolo[5,4-c]rifamycin SV of the following formula



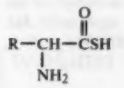
I

wherein R represents hydrogen or a straight or branched alkyl chain containing from 1 to about 10 carbon atoms and R_1 is selected from hydrogen or acetyl, which comprises condensing a molar proportion of a rifamycin compound of formula



II

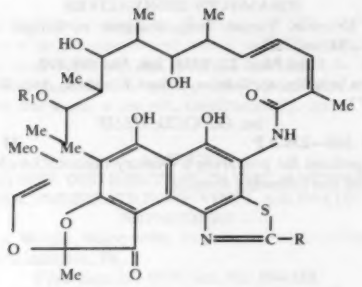
with from about 1 to about 2 molar equivalents of a thioaminoacid of formula



III

wherein R and R_1 are defined as above, in the presence of an organic solvent for a time varying from about 2 to about 10 hours, at a temperature comprised between room temperature and about 50° C., and recovering the 4-deoxy-thiazolo[5,4-c]rifamycin SV as defined in formula I.

3. A compound of formula



wherein R is a straight or branched alkyl chain containing from 1 to 10 carbon atoms and R_1 is selected from hydrogen or acetyl.

4,169,835

2-AMINO PROPANOL ISOTHIOZOL-3-ONES

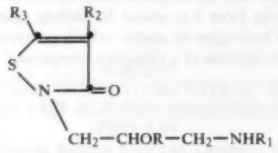
John J. Baldwin, and Gerald S. Ponticello, both of Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 792,743, May 2, 1978, Pat. No. 4,119,718. This application Mar. 6, 1978, Ser. No. 883,568

Int. Cl.[2] C07D *275/02*

U.S. Cl. 548—213 **3 Claims**

1. Compounds having the formula



and pharmaceutically acceptable salts thereof, wherein R is hydrogen or C_2–C_{12} acyl, R_1 is C_1–C_{12} alkyl, R_2 is H, Cl, Br, F, CN, $-NH_2$, $-COOR_4$ wherein R_4 is H, C_1–C_6 alkyl, phenyl, biphenyl, naphthyl, or methyl substituted phenyl $-CONR_5R_6$ wherein R_5 and R_6, when separate, are H or C_1–C_6 alkyl and, when joined, are $-CH_2-(CH_2)_3-CH_2-$, $-CH-CH_2-O-CH_2-CH_2-$, $-CH_2-CH_2-NH-CH_2-CH_2-$, or $-CH_2-CH_2-N(CH_3)-CH_2-CH_2-$, C_1–C_6 alkylthio, $-C_1$–C_6 alkylsulfinyl or $-C_1$–C_6 alkylsulfonyl and, R_3 is H, C_1–C_6 alkylthio, C_1–C_6 alkylsulfinyl or C_1–C_6 alkylsulfonyl.

4,169,836

OXAZOLINE CONTAINING ADDITIVE

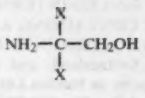
Jack Ryer, East Brunswick; James Zielinski, Somerset; Harold N. Miller, Millington, all of N.J., and Stanley J. Brois, Wantage, England, assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 543,240, Jan. 23, 1975, Pat. No. 4,049,564, which is a continuation-in-part of Ser. No. 530,235, Dec. 6, 1974, abandoned, and a continuation-in-part of Ser. No. 455,250, Mar. 27, 1974, abandoned. This application Jul. 5, 1977, Ser. No. 814,940

Int. Cl.[2] C07D *263/12*

U.S. Cl. 548—238 **9 Claims**

1. An oxazoline-containing reaction product of an alkenyl succinic anhydride having at least 8 carbon atoms in said alkenyl group with from at least 1 to less than 2 mole equivalent, per mole equivalent of said succinic anhydride, of a 2,2-disubstituted-2-amino-1-alkanol having 2 to 3 hydroxy groups and containing a total of 4 to 8 carbons, and which is represented by the formula:



wherein X is an alkyl or hydroxyl alkyl group, with at least one of the X substituents being a hydroxyl alkyl group of the structure $-(CH_2)_nOH$ wherein n is 1 to 3, said reaction conditions being at a temperature of from about 100° to 200° C. for from ½ to 24 hours whereby at least one carboxy group is converted into an oxazoline ring, said reaction product being reacted in an inert solvent with an alkylene polyamine having 2 to 12 nitrogen atoms, and wherein pairs of nitrogen atoms are joined by alkylene groups of 2 to 4 carbon atoms.

4,169,837

BICHROMOPHORIC BENZOXAZOLE ULTRAVIOLET STABILIZERS

David M. Pond; William C. Dickason, and Edward U. Elam, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 615,033, Sep. 19, 1975, Pat. No. 4,029,670. This application Mar. 28, 1977, Ser. No. 782,203

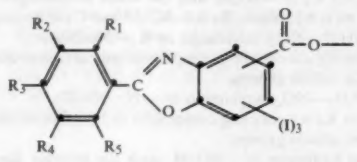
Int. Cl.[2] C07D *263/56*

U.S. Cl. 548—224 **6 Claims**

1. A polychromophoric composition of matter having the formula:

$$(A)_x—C$$

where A is a group having the structure



wherein

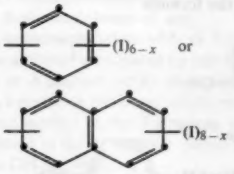
R_1, R_2, R_3, R_4 and R_5 are hydrogen, chloro, bromo, fluoro, lower alkyl, cycloalkyl, alkoxy, dimethylamino, cyano, and carboalkoxy;

I is the same as R_1, R_2, R_3 and R_4 and is present on all positions of the benzenoid ring, except the carbon atom shared with the heterocyclic ring and the carbon atom attached to the carbonyl group connecting the heterocyclic aromatic A group with the aromatic C group, at least one I substituent on one of the carbon atoms adjacent to said carbon atom attached to said carbonyl group is hydrogen and the remaining I substituents can all be the same or they may be different substituents as listed above;

x is an integer of 1 to 4; and

C is:

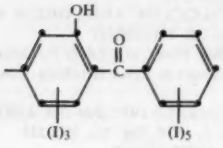
(a) an aromatic group having the formula



where I is as defined above and is present in all positions of the benzenoid ring except the carbon atom attached to the carboxyl group connecting the A and C moieties,

and said I substituents can all be the same or they may be different substituents as listed above;

(b) an aromatic group having the formula



4,169,838

PYRAZOLYLTRIAZOLE HERBICIDES

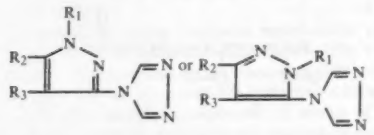
Stanley A. Lang, Jr., Pomona, N.Y., and Bryant L. Walworth, Pennington, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Oct. 6, 1975, Ser. No. 619,982

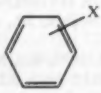
Int. Cl.[2] C07D *403/04*

U.S. Cl. 548—262 17 Claims

1. A compound having the formula:



wherein R_1 is hydrogen, alkyl (C_1–C_3), benzyl, acyl RCO wherein R is C_1–C_8 alkyl or N-alkyl (C_1–C_8) carboxamido; R_2 is hydrogen, methyl or phenyl, R_3 is methyl or



wherein X is hydrogen, halogen, alkyl (C_1–C_3), and CF_3; and the acid addition salt of the compound wherein the acid is hydrochloric acid, hydrobromic acid, hydriodic acid, nitric acid, sulfuric acid, methyl sulfate, phosphoric acid, perchloric acid, alkanoic (C_2–C_4) acid, benzene sulfonic acid, p-toluene sulfonic acid.

4,169,839

METHOD OF PREPARING A 3-IODOTHIOPHENE

Joannes P. M. Houbiers, Tegelen, and Francina H. J. Thijssen, Venlo, both of Netherlands, assignors to Ocë-Andeno B.V., Venlo, Netherlands

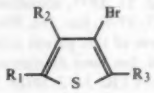
Filed Nov. 27, 1978, Ser. No. 963,672

Claims priority, application United Kingdom, Dec. 6, 1977, 50749/77

Int. Cl.[2] C07D *333/12*

U.S. Cl. 549—81 9 Claims

1. A method for preparing a 3-iodothiophene comprising reacting with copper(I)iodide in a polar aprotic solvent and at an elevated temperature a 3-bromothiophene of the formula



wherein

R_1 is H or a C_{1-4} alkyl group,

R_2 is H or a C_{1-2} alkyl group and

R_3 is H or a C_{1-2} alkyl group,

with the proviso that not more than one of R_2 and R_3 is an alkyl group.

4,169,840

METHOD OF PREPARING FUROCOUMARINS

Juhani I. T. Mäki, Porvoo; Pentti J. Mälkönen, Vantaa, and Heikki E. Nupponen, Kangasala, all of Finland, assignors to Oy Star AB, Tampere, Finland

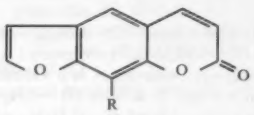
Filed Nov. 14, 1977, Ser. No. 850,868

Claims priority, application Finland, Oct. 3, 1977, 772899

Int. Cl.[2] C07D *493/04*

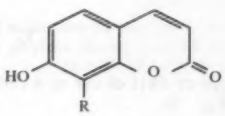
U.S. Cl. 260—343.21 2 Claims

1. Method of preparing a furocoumarin of the formula



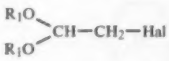
I

wherein R is selected from the group consisting of hydrogen, a hydroxyl group and a lower alkoxy group, characterized in that a substituted coumarin of the formula



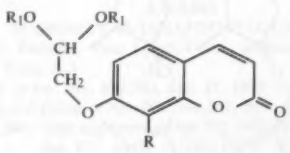
II

wherein R denotes the same as before, or an alkali metal salt thereof is reacted with a haloacetal of the formula



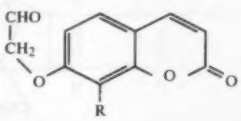
III

wherein R_1 is a lower alkyl group and Hal is selected from the group consisting of chlorine and bromine, in an inert, anhydrous organic solvent or solvent mixture, to obtain an intermediate product of the formula



IV

wherein R and R_1 denote the same as before, which is treated with a dilute acid at an elevated temperature, to obtain a compound of the formula



V

wherein R denotes the same as before, which is converted into the end product of the formula I by heating with a dilute alkaline solution, and acidfying said end product.

4,169,841

ALKENYL-SUBSTITUTED 9-DEOXY-6,9-α-EPOXYMETHANO-PG ANALOGS

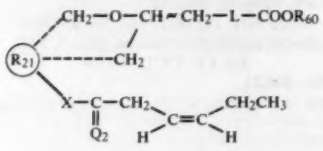
Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 788,145, Apr. 19, 1977, Pat. No. 4,130,569. This application Sep. 11, 1978, Ser. No. 941,815

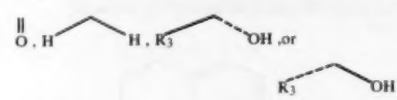
Int. Cl.[2] **C07D** *311/02*

U.S. Cl. 260—345.2 **10 Claims**

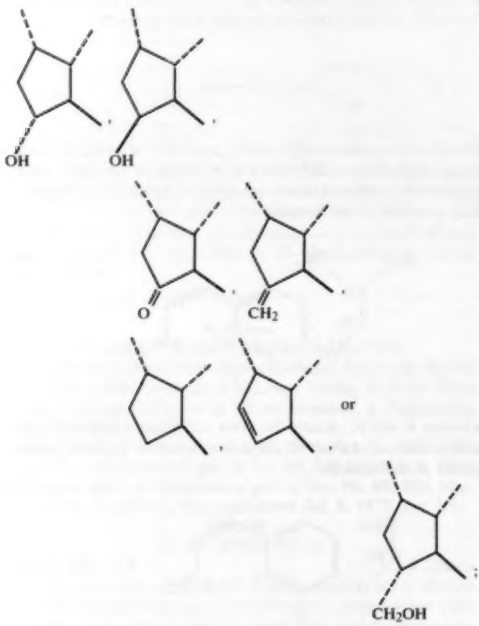
1. A cyclic ether of the formula



wherein L is (1) a valence bond, (2)—$(CH_2)_d$—wherein d is one to 5 inclusive, (3)—$(CH_2)_t$—CF_2—wherein t is 2, 3, or 4, (4) —CH_2—CH=CH—A—wherein A is a valence bond or —$(CH_2)_h$—wherein h is one, 2, or 3, or (5) —CH_2—O—CH_2—Y—wherein Y is a valence bond or —$(CH_2)_k$—wherein k is one or 2; wherein Q_2 is



wherein R_3 is hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein R_{21} is



wherein R_{60} is (a) hydrogen, (b) alkyl of one to 12 carbon atoms, inclusive, or (c) a pharmacologically acceptable cation; wherein X is cis- or trans—CH=CH—, —C≡C—, or —CH_2CH_2—; and wherein the wavy line (~) indicates attachment in cis or trans configuration.

4,169,842

CARBOXYMETHYLOXYSUCCINIC ANHYDRIDE AND ACID HALIDE THEREOF

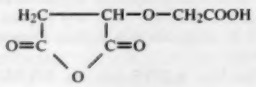
Vincent Lamberti, Upper Saddle River, and Eddie N. Gutierrez, Fort Lee, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 797,226, May 16, 1977, Pat. No. 4,093,634. This application Apr. 4, 1978, Ser. No. 893,231

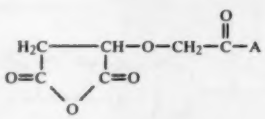
Int. Cl.[2] **C07D** *307/60*

U.S. Cl. 260—346.74 **3 Claims**

1. A compound of the formula:



2. A halocarbonylmethyloxysuccinic anhydride of the formula:



wherein A is selected from the group consisting of Cl, Br and I.

4,169,843

METHOD FOR HYDROGENATION

Eugene I. Snyder, Mt. Prospect, Ill., assignor to Kraft, Inc., Glenview, Ill.

Filed Jun. 29, 1977, Ser. No. 811,167

Int. Cl.[2] **C11C** *3/12;* **A23B** *4/04*

U.S. Cl. 260—409 **3 Claims**

1. A single stage process for preparing a hydrogenated liquid oil which comprises hydrogenating a liquid oil having an IV of from about 90 to about 135 in the presence of a catalyst system, said catalyst system comprising from about 0.007 to about 0.03 percent by weight based on the level of oil of a conventional nickel catalyst and from about 0.02 to about 0.10 percent by weight based on the level of oil of a sulphur-poisoned catalyst wherein the ratio of conventional nickel catalyst to sulphur-poisoned catalyst is within the range of from about 0.1:1 to about 101 whereby a hydrogenated oil is provided having greater than about 60 percent trans isomer, less than about 7 percent by weight diene and less than about 10 percent by weight stearate without fractionation.

4,169,844

HYDROGENATION OF UNREFINED GLYCERIDE OILS

John M. Hasman, Chatham, N.J., assignor to SCM Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 850,150, Nov. 10, 1977, which is a continuation-in-part of Ser. No. 733,348, Oct. 18, 1976, abandoned, said Ser. No. 850,160, is a continuation-in-part of Ser. No. 778,710, Mar. 17, 1977, abandoned. This application Apr. 17, 1978, Ser. No. 896,508

The portion of the term of this patent subsequent to Jun. 19, 1996, has been disclaimed.

Int. Cl.[2] **C11C** *3/12;* **B01J** *23/84*

U.S. Cl. 260—409 **30 Claims**

1. A process for the hydrogenation of a crude glyceride oil which comprises:

subjecting said oil to hydrogenation in a hydrogenation zone

with hydrogen gas under hydrogenation conditions in the presence of greater than 0.02 weight percent nickel hydrogenation catalyst and of greater than about 0.2 weight percent copper chromite adjunct catalyst, said catalyst weight percent based on the weight of said oil,

the concentration of said adjunct catalyst being established and maintained broadly proportional to the concentration of contaminants in said crude oil; and

discontinuing said hydrogenation after at least a significant increase in saturation of said oil has occurred.

4,169,845

METHOD OF PREPARING TRANSITION METAL-OLEFIN COMPLEX COMPOUNDS AND ALKALI METAL-TRANSITION METAL-OLEFIN COMPLEX COMPOUNDS

Klaus Jonas, Mülheim, Fed. Rep. of Germany, assignor to Studiengesellschaft Kohle mbH, Mülheim, Fed. Rep. of Germany

Filed Nov. 14, 1977, Ser. No. 851,558

Claims priority, application Fed. Rep. of Germany, May 27, 1977, 2724111

Int. Cl.[2] **C07F** *7/00, 7/28, 11/00, 15/00*

U.S. Cl. 260—429 CY **4 Claims**

1. Method of preparing transition metal-olefin complex compounds and alkali metal-transition metal-olefin complex compounds or their solutions, either containing C_5H_5 or free of C_5H_5, respectively, which essentially comprises reacting transition-metallocene complex compounds of metals of Group VIII or metals chromium, molybdenum, titanium or vanadium with an alkali metal or an alkali metal-transition metal complex compound, in suitable solvents, at temperatures between −60° C. and +100° C.

4,169,846

CIS-PLATINUM (II) COMPLEX OF TRANS-L-1,2-DIAMINOCYCLOHEXANE

Yoshinori Kidani, 2-1, Mataho-machi, Nishi-ku, Nagoya-shi, Aichi-ken, and Kenji Inagaki, 5, Shofuen, Hiroji-cho, Showa-ku, Nagoya-shi, Aichi-ken, both of Japan

Continuation of Ser. No. 775,216, Mar. 7, 1977, abandoned. This application Jul. 13, 1978, Ser. No. 924,320

Claims priority, application Japan, Sep. 6, 1976, 51/106509

Int. Cl.[2] **C07F** *15/00*

U.S. Cl. 260—429 R **1 Claim**

1. Cis-oxalato(trans-l-1,2-diaminocyclohexone)platinum (II).

4,169,847

PROCESS FOR THE MANUFACTURE OF α-CHLOROALKANOYL CHLORIDES

Gerhard Degischer, Füllinsdorf; Werner Angst, Muttenz, and Mario Valloton, Monthey, all of Switzerland, assignors to Säurefabrik Schweizerhall, Schweizerhalle, Switzerland

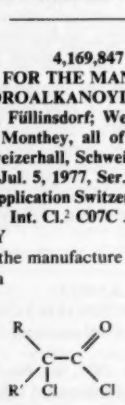
Filed Jul. 5, 1977, Ser. No. 812,625

Claims priority, application Switzerland, Jul. 7, 1976, 8700/76

Int. Cl.[2] **C07C** *53/14*

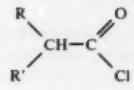
U.S. Cl. 260—544 Y **8 Claims**

1. A process for the manufacture of α-chloroalkanoyl chlorides of the formula



(1)

wherein each of R and R′ independently represents a hydrogen atom or an alkyl radical, by reacting alkanoyl chlorides of the formula



(2)

wherein R and R′ are as defined in formula (1) above, with chlorine at elevated temperature of between 40° and 110° C., which process comprises carrying out the reaction in the presence of chlorosulphonic acid as catalyst in an amount of 0.1 to 2 percent by weight.

4,169,848

POLYMERIC DIACYL PEROXIDES

Takeshi Komai, and Masaru Matsushima, both of Chita, Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo, Japan

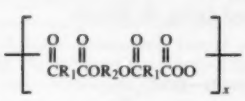
Filed May 24, 1978, Ser. No. 909,125

Claims priority, application Japan, May 31, 1977, 52-62812

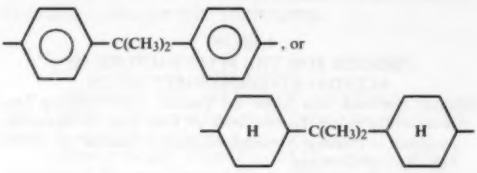
Int. Cl.[2] **C07C** *69/76*

U.S. Cl. 260—453 RZ **11 Claims**

1. A compound having the formula



wherein R_1 is alkylene having 1 to 15 carbon atoms or phenylene, R_2 is alkylene having 2 to 10 carbon atoms, $-(CH_2)_2O(CH_2)_2-$, $-(CH_2)_2O(CH_2)_2O(CH_2)_2-$,



and X is a number of from 2 to 20.

4,169,849

11-DESOXY-15-THIAPROSTAGLANDINS

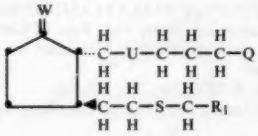
Jacob J. Plattner, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 868,503, Jan. 11, 1978, Pat. No. 4,129,728, which is a division of Ser. No. 740,381, Nov. 10, 1976, Pat. No. 4,092,349. This application Oct. 27, 1978, Ser. No. 955,492

Int. Cl.[2] **A61K** *31/165;* **C07C** *103/78*

U.S. Cl. 260—558 S **2 Claims**

1. An optically active compound of the formula



and the enantiomer and racemate thereof wherein:

Q is $-CONHCOR_3$;

U is ethylene or cis vinylene

W is

or oxygen;

R_1 is selected from the group consisting of phenyl and mono-substituted phenyl, said substituent being selected from the group consisting of fluoro, chloro, methyl, methoxy and trifluoromethyl;

R_3 is selected from the group consisting of alkyl having from one to four carbon atoms and phenyl.

4,169,850

β-SULFENYL ACRYLIC ACID COMPOUNDS AND PROCESS OF PREPARING SAME

Norioki Miyamoto, Sakura, and Shigeo Inoue, Saitama, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

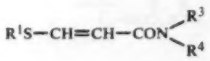
Continuation-in-part of Ser. No. 699,324, Jun. 24, 1976, abandoned. This application Jun. 17, 1977, Ser. No. 807,509

Claims priority, application Japan, Jul. 4, 1975, 50-82372; Jul. 7, 1975, 50-83241; Jul. 7, 1975, 50-83242; Jul. 11, 1975, 50-84944; Jul. 11, 1975, 50-84945

Int. Cl.[2] C07C *97/16;* A01N *9/20;* C11D *1/18*

U.S. Cl. 260—561 S **18 Claims**

1. A compound having the formula



wherein R^1 is alkyl having 6 to 20 carbon atoms; and wherein R^3 and R^4, which can be the same or different, are hydrogen, unsubstituted alkyl having 1 to 6 carbon atoms or hydroxy-substituted alkyl having 2 to 6 carbon atoms.

4,169,851

PROCESS FOR THE MANUFACTURE OF ACETOACETYL-AMINOBENZENES

Rüdiger Berthold, Bad Soden am Taunus, and Wolfgang Tronich, Hofheim am Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 2, 1978, Ser. No. 957,041

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1977, 2749327

Int. Cl.[2] C07C *102/00*

U.S. Cl. 260—562 K **6 Claims**

1. Process for the manufacture of 1-acetoacetylamino-2,5-dimethoxy-4-chlorobenzene, 1-acetoacetylamino-2,4-dimethylbenzene and 1-acetoacetylamino-2-methyl-5-chlorobenzene from diketene and the corresponding aniline in the presence of water with the addition of catalytic amounts of acid, which comprises reacting the aniline in an inert organic solvent or diluent in the presence of from 0.1 to 6%, calculated on the weight of the aniline, of water.

4,169,852

PROCESS FOR THE PREPARATION OF N-(CHLOROARYL)-N',N'-DIALKYLAMIDINES

Franz Landauer, Frankfurt am Main, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 9, 1975, Ser. No. 566,401

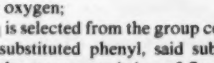
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1974, 2417669

Int. Cl.[2] C07C *123/00*

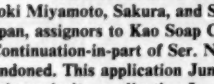
U.S. Cl. 260—564 RF **4 Claims**

1. A process for the preparation of an N-(chloroaryl)-N',N'-dialkylamidine which comprises reacting, in a halogenated hydrocarbon, an N',N'-dialkylamide of the formula

wherein R^2 is hydrogen or a lower aliphatic radical and each of R^3 and R^4 is an aliphatic radical of up to 8 carbon atoms, with an acid condensing agent to form the adduct thereof, reacting said adduct with an amine of the formula



wherein R^1 is (a) phenyl or (b) naphthyl, or (a) phenyl or (b) naphthyl substituted by phenyl, naphthyl or lower alkyl or substituted phenyl, naphthyl or lower alkyl, said substituents in (a) or (b) being bound directly or by means of an oxygen, sulfur or nitrogen atom, and chlorinating, without prior isolation, the reaction product of the formula



at a temperature of about 15° to 80° C.

4,169,853

HOMOGENEOUS RUTHENIUM CATALYSTS USEFUL IN THE REDUCTION OF ORTHO-SUBSTITUTED NITROAROMATICS TO AMINES

John F. Knifton, Austin, Tex., assignor to Texaco Development Corporation, White Plains, N.Y.

Filed Feb. 6, 1978, Ser. No. 875,477

Int. Cl.[2] C07C *85/11*

U.S. Cl. 260—575 **3 Claims**

1. A process for selectively hydrogenating the nitro groups of mononitroaromatic substrates wherein said nitroaromatics contain one or more ortho-substituents selected from the group consisting of alkyl, halogenated alkyl, alkoxyl, acetyl, halo, substituted amino and amino substituents, and mixtures thereof, to the corresponding amines, utilizing a homogeneous ruthenium-containing catalyst complex selected from the group consisting of $RuCl_2[P(C_6H_5)_3]_3$, $[RuCl_2(CO)_3]_2$, $RuCl_2[As(C_6H_5)_3]_3$ $RuHCl[P(C_6H_5)_3]_3$, $Ru(CH_3COCHCOCH_3)_3$, $RuCl_3.XH_2O$, $RuCl_3NO[P\text{-}(C_6H_5)_3]_2$, $RuCl_2.(CO)_2[P(C_6H_5)_3]_2$ and $Ru(CH_3COO)_3$ in combination with a quaternary ammonium hydroxide selected from the group consisting of tetramethylammonium hydroxide, tetraethylammonium hydroxide, benzyltrimethylammonium hydroxide, trimethyloctylammonium hydroxide and dimethyldioctylammonium hydroxide, by the process consisting essentially of,

a. admixing each mole of said nitroaromatic substrates to be reduced with at least a catalytic amount of one or more of said ruthenium-containing catalyst complexes in an oxidizer-free, non-aqueous solvent media to form a reaction mixture,

b. introducing into said reaction mixture an excess of quaternary ammonium hydroxide and at least sufficient hydrogen gas to hydrogenate the nitro groups of said substrates to the corresponding amines, at superatmospheric pressures ranging from about 100 psi to about 2000 psi, and

c. heating said pressurized reaction mixture between about 20° to about 160° C. until said nitroaromatic substrates are reduced to amines.

4,169,854

DIRECT ACIDIFIED YOGURT

Robert S. Igoe, San Diego, Calif., assignor to Merck & Co., Inc., Rahway, N.J.

Filed May 12, 1977, Ser. No. 796,251

The portion of the term of this patent subsequent to Nov. 15, 1994, has been disclaimed.

Int. Cl.[2] A23C *9/10, 23/00*

U.S. Cl. 426—583 **8 Claims**

4. A thickener blend for use in preparing a direct acidified

yogurt consisting essentially of from about 40 to about 80 parts by weight of starch which is stable at low pH, from about 20 to about 45 parts by weight sodium carboxymethyl cellulose, from about 3.0 to about 8.0 parts by weight xanthan gum and from about 0.7 to about 3.0 parts by weight locust bean gum.

4,169,855

N'-DERIVATIVES OF N-(2-MERCAPTO-ETHYL)-2-NITRO-1,1-ETHENEDIAMINE

Barry J. Price, London; John W. Clitherow, Sawbridgeworth, and John Bradshaw, Ware, all of England, assignors to Allen & Hansbury, Limited, London, England

Division of Ser. No. 818,762, Jul. 25, 1977, Pat. No. 4,128,658. This application Oct. 13, 1978, Ser. No. 951,024

Claims priority, application United Kingdom, Aug. 4, 1976, 32465/76; Dec. 6, 1976, 50685/76; May 13, 1977, 20187/77

Int. Cl.[2] C07C *87/14, 87/22, 87/24*

U.S. Cl. 260—583 EE **2 Claims**

1. A compound of the formula

$$HS(CH_2)_2NHCNHR_3$$
$$\|$$
$$CHNO_2$$

in which R_3 is hydrogen, lower alkyl, lower alkenyl or alkoxyalkyl.

4,169,856

PROCESS FOR THE PREPARATION AND THE RECOVERY OF ETHANOLAMINES

Gioacchino Cocuzza, Catania, and Gianni Torreggiani, Busto Arsizio, both of Italy, assignors to Euteco S.p.A., Milan, Italy

Filed Sep. 18, 1978, Ser. No. 943,498

Int. Cl.[2] C07C *89/02, 89/04*

U.S. Cl. 260—585 B **8 Claims**

1. A process for the preparation of ethanolamines by ammonolysis of ethylene oxide with aqueous ammonia and for the recovery of said ethanolamines, which comprises the steps of:

(a) preparing an aqueous ammoniacal solution containing from 20–50% by weight of ammonia by passing ammonia through an absorption column of the bubbling-tray type operating at a temperature of from 10° C. to 40° C. and at an absolute pressure of from 1.5 to 5 kg/cm^2, in counterflow with water and a recycled aqueous ammoniacal solution, each of the bubbling-trays being individually cooled to maintain the absorption temperature within the range of from 10° to 40° C.;

(b) reacting said aqueous ammoniacal solution prepared in stage (a) with ethylene oxide in an isothermal reactor at a temperature of from 50° to 110° C., at an absolute pressure of from 10 to 30 kg/cm^2 and with an ammonia/ethylene oxide molar ratio of from 1/1 to 8/1, until at least 50% conversion of the ethylene oxide is achieved;

(c) feeding the reaction product of stage (b) into an adiabatic reactor and continuing the ammonolysis reaction until the conversion of said ethylene oxide to said ethanolamines is substantially complete, said ammonolysis reaction being carried out with a maximum temperature at the outlet from said adiabatic reactor of the order of 180° C.;

(d) removing the unreacted ammonia and a proportion of the water present in the reaction product of stage (c) by heating at an absolute pressure of from 0.5 to 1.0 kg/cm^2, condensing the aqueous ammoniacal vapors thus evolved, and recycling the aqueous ammoniacal solution thus obtained to stage (a);

(e) evaporating water from the residual aqueous solution of ethanolamines recovered in stage (d) in an evaporator at a pressure slightly greater than atmospheric and recycling the water vapour produced to provide heat for use in stage (d), and recovering a solution of ethanolamines having a water content not greater than 30% by weight; and

(f) dehydrating said solution of ethanolamines recovered in stage (e) in a distillation column operated at a pressure lower than atmospheric, condensing the distillate from the head and using a part of the resulting condensate to wash the vapors at the head of said evaporator in stage (e) with consequent removal of the ethanolamine vapors contained therein, and recovering the dehydrated ethanolamines at the foot of said distillation column.

4,169,857

SEPARATION OF CYCLOHEXYLBENZENE-CYCLOHEXANONE-PHENOL-CONTAINING MIXTURES BY HYDROGENATION AND DISTILLATION

Timothy P. Murtha, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 5, 1978, Ser. No. 948,837

Int. Cl.[2] C07C *45/24, 7/04, 45/00*

U.S. Cl. 260—586 P **5 Claims**

1. A process for the improved production of cyclohexanone which comprises, in a zone, oxidizing cyclohexylbenzene to produce cyclohexylbenzene hydroperoxide, acid-cleaving the cyclohexylbenzene hydroperoxide thus obtained, thus obtaining a mixture of cyclohexylbenzene, phenol and cyclohexanone, subjecting the mixture to hydrogenation to convert selectively the phenol to cyclohexanone, fractionally separating the cyclohexanone and cyclohexylbenzene and returning the cyclohexylbenzene to said zone.

3. The recovery of cyclohexylbenzene from a mixture containing it together with phenol and cyclohexanone which comprises subjecting the mixture to hydrogenation conditions selectively to convert phenol to cyclohexanone and separating the cyclohexylbenzene and cyclohexanone.

4,169,858

PROCESS FOR PREPARING A KETONE

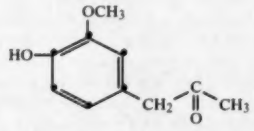
George Gal, Watchung, and Seemon H. Pines, Murray Hill, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 753,151, Dec. 31, 1976, abandoned. This application Mar. 6, 1978, Ser. No. 883,759

Int. Cl.[2] C07C *45/00, 45/16*

U.S. Cl. 260—590 R **12 Claims**

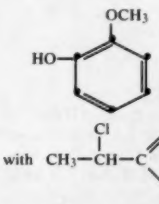
1. A process for preparing a compound having the formula



I

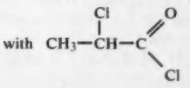
which comprises

(a) reacting a compound having the formula

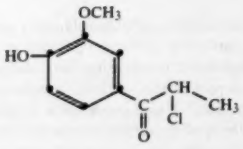


II

with

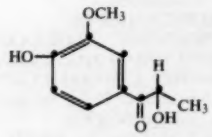


in the presence of a Friedel Crafts catalyst to obtain



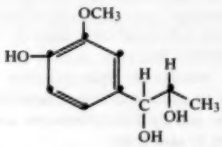
III

(b) reacting compound III with a strong base in the substantial absence of oxygen to obtain



IV

(c) reducing compound IV with hydrogen in the presence of a catalyst to obtain



V

and

(d) rearranging compound V to obtain compound I.

4,169,859

PROCESS, PRODUCTS AND COMPOSITION

Thomas J. Clough, Glenwood, Ill., assignor to Atlantic Richfield Company, Philadelphia, Pa.

Division of Ser. No. 625,977, Oct. 28, 1975, Pat. No. 4,028,414, which is a continuation of Ser. No. 804,037, Jan. 2, 1969, abandoned, which is a division of Ser. No. 631,163, Apr. 17, 1967, Pat. No. 3,479,291. This application Jan. 3, 1977, Ser. No. 756,580

Int. Cl.[2] C07C *45/15*

U.S. Cl. 260—593 R **10 Claims**

1. A mineral oil-soluable polymeric ketone having a molecular weight of from about 1,000 to 5,000, said polymeric ketone being prepared by the polymerization of a major portion of an alpha-monoalkene having from 3 to about 30 carbon atoms and a mixture thereof and optionally a minor portion of another olefinically unsaturated copolymerizable monomer having from about 3 to about 25 carbon atoms, said polymerization being initiated by the use of an acyl halide strong Friedel Crafts catalyst complex wherein the acyl portion of the acyl halide has from 2 to about 10 carbon atoms and is selected from the group consisting of the corresponding acid halides of saturated aliphatic acids and the corresponding acid halide of unsubstituted aromatic acids and said polymerization being conducted at a temperature and for a time sufficient to form said polymeric ketone.

4,169,860

INSECT PHEROMONE

Richard J. Anderson, and Clive A. Henrick, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Filed Mar. 13, 1978, Ser. No. 886,324

Int. Cl.[2] C07C *47/20*

U.S. Cl. 260—601 R **2 Claims**

1. The compound, 3-isopropenyl-6-hepten-1-al.

4,169,861

HYDROFORMYLATION PROCESS

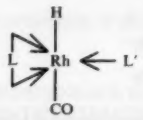
O. Richard Hughes, Chatham, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Aug. 19, 1977, Ser. No. 825,894

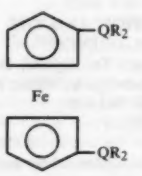
Int. Cl.[2] C07C *45/10*

U.S. Cl. 260—604 HF **26 Claims**

1. In a process for the production of an alkanal-1 by hydroformylation of an alpha-olefin, the improvement which comprises contacting an alpha-olefin with hydrogen and carbon monoxide at a temperature between about 25° C. and 150° C. and a pressure between about 15 and 3000 psi in the presence of a catalyst consisting essentially of a stabilized complex of rhodium metal, bidentate ligand and monodentate ligand, which catalyst components are provided in a molar ratio of 1 mole of bidentate ligand and between about 1.2–800 moles of monodentate ligand per gram atom of rhodium metal in the hydroformylation medium, and said catalyst complex corresponding to the structural formula:



wherein L is a bidentate ligand having the formula:



where Q is a group VA element selected from nitrogen, phosphorus and arsenic; and R is an organic radical selected from alkyl, aryl, alkoxy-substituted aryl and fluoro-substituted aryl groups containing between one and about twenty carbon atoms; and wherein L′ is a monodentate ligand having the formula:

$Q'R'_3$

where Q′ is a group VA element selected from nitrogen, phosphorus and arsenic; R′ is an organic radical selected from aliphatic, alicyclic and aromatic groups containing between one and about twenty carbon atoms; and the steric parameter θ of $Q'R'_3$ in the catalyst complex is an apex angle between about 135 and 150 degrees.

4,169,862

LOW TEMPERATURE CATALYTIC COMBUSTION OF CHLOROHYDROCARBONS

Jamal S. Eden, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Jul. 22, 1974, Ser. No. 490,391

Int. Cl.[2] C07C *21/00*

U.S. Cl. 260—654 A **14 Claims**

1. In the process of producing chlorinated derivatives of ethylene which includes the step of oxyhydrochlorination whereby hydrogen chloride is reacted with oxygen and ethylene, the improvement which comprises separating in a stream from said process any unwanted chlorinated ethylene derivatives and other by-products, injecting said stream into a combustion catalyst bed comprised of 0.01% to 0.5% by weight of platinum or palladium and 99.99% to 99.50% by weight of a material selected from the group consisting of Al_2O_3, SiO_2 and

a mixture of Al_2O_3 and SiO_2, injecting air into said bed along with said stream, maintaining said bed at a temperature in the range of about 300° C. to about 450° C. to produce a mixture of hot combustion gases containing essentially hydrogen chloride and being essentially free of both elemental chlorine and chlorohydrocarbon materials, and recycling said mixture of gases to said oxyhydrochlorination step.

4,169,863

CODIMERS OF NORBORNADIENE AND ALKYNES

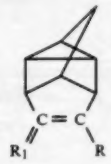
Harry K. Myers, Jr., Aston; James E. Lyons, Wallingford, and Abraham Schneider, Overbrook Hills, all of Pa., assignors to Suntech, Inc., Philadelphia, Pa.

Division of Ser. No. 842,812, Oct. 17, 1977. This application Mar. 22, 1978, Ser. No. 888,905

Int. Cl.[2] C07C *13/28;* **C06B** *43/00;* **B01J** *31/12*

U.S. Cl. 585—22 **10 Claims**

1. Codimer of norbornadiene and an alkyne having the following structure:



wherein R_1 is a C_1–C_{10} paraffinic or iso alkyl and R is a C_1–C_{10} paraffinic or iso alkyl or a hydrogen and wherein R_1 and R are interchangeable.

4,169,864

CODIMERS OF NORBORNADIENE AND PHENYLACETYLENES

James E. Lyons, Wallingford; Abraham Schneider, Overbrook Hills, and Harry K. Myers, Jr., Aston, all of Pa., assignors to Suntech, Inc., Philadelphia, Pa.

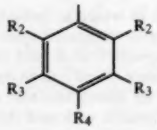
Division of Ser. No. 842,813, Oct. 17, 1977. This application Mar. 22, 1978, Ser. No. 888,906

Int. Cl.[2] C07C *13/28, 15/12*

U.S. Cl. 585—27 **2 Claims**

1. Codimer of norbornadiene and phenylacetylene having the following structure:

wherein R is a hydrogen, phenyl, or phenyl having an alkyl substituent and R_1 is a phenyl or a phenyl having an alkyl substituent wherein the phenyl having alkyl substituents has the following structure:



wherein R_2 is a hydrogen or methyl; R_3 is a hydrogen or C_1–C_5 alkyl; and R_4 is a hydrogen or C_1–C_{10} alkyl.

4,169,865

PRODUCTION OF AROMATIC HYDROCARBONS

John R. Bamforth, and Raymond Higgins, both of Middlesbrough, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Jun. 13, 1978, Ser. No. 915,121

Claims priority, application United Kingdom, Jun. 17, 1977, 25442/77

Int. Cl.[2] C07C *15/02;* **B01J** *23/08*

U.S. Cl. 585—314 **14 Claims**

1. A process for the production of aromatic hydrocarbons which comprises contacting a feed comprising isobutene at elevated temperature and in the presence of added oxygen with a catalytic amount of a catalyst for the oxidative dimerisation of olefins, to form a product comprising at least one dimer of isobutene and contacting the whole of said product (including any unreacted hydrocarbon feedstock) with a non-acid catalyst for the cyclisation of the isobutene dimer whereby to form a final product comprising aromatic hydrocarbons.

4,169,866

POLYMER SYSTEMS CONTAINING POLYCARBODIIMIDES AND THERMOPLASTIC POLYMER

Wulf von Bonin, Leverkusen; Wolfgang Oberkirch, Cologne, and Ulrich von Gizycki, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 4, 1977, Ser. No. 784,276

Claims priority, application Fed. Rep. of Germany, Apr. 8, 1976, 2615343

Int. Cl.[2] C08L *67/00, 69/00, 77/00, 79/00*

U.S. Cl. 525—131 **2 Claims**

1. A thermoplastic processible polymer system comprising a homogeneous mixture of (A) from 0.5 to 95% by weight of a polycarbodiimide obtained by the catalyzed intermolecular elimination of CO_2 from an isocyanate prepolymer having a molecular weight of from 500 to 10,000 and obtained by reacting a polyisocyanate with at least one member selected from the group consisting of polyesters and polyethers and (B) 99.5 to 5% by weight of a thermoplastic polymer selected from the group consisting of copolymers of styrene and acrylonitrile, ABS-polymers, polyacrylates, polymethacrylates, polyphenylene ethers, polystyrene, polyacetals, polycarbonates, polyurethanes, polyamides, polyolefins and copolymers of ethylene and vinylacetate.

4,169,867

MOLDING COMPOSITIONS BASED ON OXYMETHYLENE POLYMERS

Karlheinz Burg, Naurod, and Günther Kirsch, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Oct. 15, 1975, Ser. No. 622,502

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1974, 2449343

Int. Cl.[2] C08L *63/00, 67/00, 67/06*

U.S. Cl. 525—417 **8 Claims**

1. Molding composition consisting essentially of a mixture of

(A) from 99.9 to 50 weight % of an oxymethylene polymer which contains optionally from 0.1 to 20 weight % of oxyalkylene units having from 2 to 8 adjacent carbon atoms in the main chain, and

(B) from 0.1 to 50 weight % of a copolyester consisting of

(a) from 75 to 35 weight % of units of an ester of at least one aromatic dicarboxylic acid having a molecular weight of at most 300 and of a diol having a molecular weight of from 350 to 8,000, and

(b) from 25 to 65 weight % of units of an ester of at least one aromatic dicarboxylic acid having a molecular weight of at most 300 and of a diol having a molecular weight of at most 250.

4,169,868

PROCESS FOR THE PREPARATION OF NEW HIGH-MOLECULAR SEGMENTED POLYESTER-POLYCARBONATES WHICH CAN BE PROCESSED BY THERMOPLASTIC METHODS AND NEW POLYESTER-POLYCARBONATES OBTAINED ACCORDING TO THE PROCESS

Manfred Schreckenberg, Krefeld; Klaus König, Leverkusen; Dieter Freitag, and Volker Serini, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 18, 1977, Ser. No. 816,567

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1976, 2636783

Int. Cl.[2] C08G *63/62, 63/24*

U.S. Cl. 525—439 **8 Claims**

1. A process for the production of a high-molecular weight, polyester-polycarbonate which can be processed by thermoplastic methods, comprising reacting segments which contain carboxyl groups and have average molecular weights Mn of greater than about 600 with one or more bisphenols, phosgene and about 0.2–5 mol %, relative to the mol amount of bisphenols, of a tertiary aliphatic amine by the two-phase boundary polycondensation process at a pH value of between about 9 and 14 and at a temperature of between about 0° C. and 80° C.

4,169,869

LOW GLOSS ABS EXTRUSION COMPOSITIONS

David L. Milenius, Rocky River, Ohio, assignor to Abtec Chemical Company, Louisville, Ky.

Filed Nov. 3, 1977, Ser. No. 848,189

Int. Cl.[2] C08L *51/00, 55/02*

U.S. Cl. 525—87 **5 Claims**

1. A solid thermosplastic composition comprising

(1) an ABS graft copolymer of acrylonitrile, butadiene and styrene, comprising from about 40 to 90 weight percent combined acrylonitrile and styrene, said styrene being present in amount from about 30 to 80 weight percent, said acrylonitrile being present in amount from about 10 to about 40 weight percent and said butadiene being present in amount from about 10 to 60 weight percent, and additionally about 4 to 12 total weight parts per 100 weight parts of

(2) at least about 0.5 weight parts of added poly(butadiene-1,3) and

(3) at least 0.5 weight parts of a copolymer of butadiene and acrylonitrile containing less than 30 weight percent acrylonitrile.

4,169,870

METHOD OF POLYMERIZING VINYL HALIDE WITH OLEFIN POLYMERS AND COPOLYMERS AND COMPOSITIONS THEREOF

Akio Takahashi, Amherst, N.Y., assignor to Hooker Chemicals & Plastics Corp., Niagara Falls, N.Y.

Division of Ser. No. 674,202, Apr. 5, 1976, Pat. No. 4,071,582, which is a continuation-in-part of Ser. No. 427,895, Dec. 26, 1973, abandoned, which is a continuation-in-part of Ser. No. 251,099, May 8, 1972, abandoned. This application Dec. 19, 1977, Ser. No. 862,081

The portion of the term of this patent subsequent to Jul. 31, 1996, has been disclaimed.

Int. Cl.[2] C08F *279/00*

U.S. Cl. 525—315 **28 Claims**

1. In a process for the preparation of a vinyl chloride polymer comprising polymerizing in bulk in liquid phase in the presence of a trunk polymer and a free radical initiator compound for said polymerization, vinyl chloride monomer either alone or in combination with up to 50% by weight based on the total weight of monomer, of another ethylenically unsaturated monomer copolymerizable therewith, the improvement which comprises carrying out the polymerization in the presence of about 0.05% to about 20% by weight, based upon said vinyl chloride monomer, of a trunk polymer consisting essentially of an olefin trunk polymer wherein the monomer units consist of monomer units of an aliphatic hydrocarbon mono-unsaturated olefin of 2 to 8 carbon atoms said olefin polymer being soluble, partially soluble, or dispersible in said monomer or monomers, and said olefin polymer having a weight average molecular weight of about 50,000 to about 1,000,000.

4,169,871

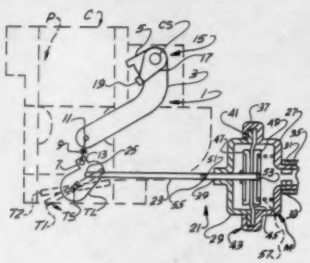
STAGED CARBURETOR

Steven P. Eason, Arnold, Mo., assignor to ACF Industries, Inc., New York, N.Y.

Filed Oct. 12, 1978, Ser. No. 950,854

Int. Cl.[2] F02M *11/04*

U.S. Cl. 261—23 A **7 Claims**



1. In a staged multi-barrel carburetor for an internal combustion engine, the carburetor having at least two air induction passages and first and second throttle valves one of which is positioned in each of the respective induction passages, each throttle valve being movable between a closed and an open position and the first throttle valve being operable to open prior to the second throttle valve opening, and a countershaft interconnected with the first throttle valve for rotation therewith as it opens and closes, the improvement comprising;

means interconnecting the countershaft with the second throttle valve to open the second throttle valve as the first throttle valve opens;

means carried by the countershaft for producing movement of the interconnecting means to open the second throttle valve after the first throttle valve has opened to a predetermined open position; and

means responsive to the vacuum in the engine for delaying opening movement of the second throttle valve after the first throttle valve has opened to its predetermined open position if engine vacuum exceeds a predetermined level thereby to prevent lags in engine performance which may occur during engine acceleration.

4,169,872

CARBURETOR

Fred E. Latz, St. Ann, and Kenneth A. Berkbigler, Fenton, both of Mo., assignors to ACF Industries, Inc., New York, N.Y.

Filed Jun. 12, 1978, Ser. No. 914,314

Int. Cl.[2] F02M *1/10*

U.S. Cl. 261—52 **17 Claims**

1. A carburetor for an internal combustion engine comprising:

a carburetor body in which an induction passage is formed for air to be drawn into said engine;

a throttle valve positioned in said induction passage and movable between a closed and an open position to control the quantity of air drawn into said engine;

a throttle lever movable with said throttle valve;

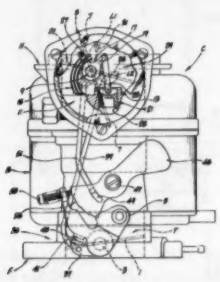
a staging valve positioned in said induction passage and movable between an open and a closed position, said staging valve being substantially closed during cranking

of said engine whereby a suitably rich air-fuel mixture is supplied to said engine to start it;

means for moving said staging valve to a first open position when said engine starts and toward its fully open position as said engine warms up;

a fast idle cam for controlling the degree of closing of said throttle valve during engine idle conditions, said fast idle cam having a contour surface in contact with said throttle lever and said fast idle cam being movable to change the portion of its contour surface in contact with said throttle lever and change the degree of throttle valve closing;

means for limiting the opening movement of said staging valve to a second open position which is intermediate its first open position and its fully open position, the limiting of said staging valve movement to this second and less than fully open position limiting the usable air capacity of



said carburetor and said limiting means including means linking said moving means with said fast idle cam to control the movement of said fast idle cam and the portion of its contour surface in contact with said throttle lever, said linking means inhibiting movement of said fast idle cam until said staging valve moves from its first open position toward its fully open position; and

staging means for increasing the usable air capacity of said carburetor, said staging means being responsive to the movement of said throttle valve past a predetermined open position for alllowing said staging valve to move freely between its second open position and its fully open position solely in response to the demand for air by said engine, the free movement of said staging valve to its fully open position increasing the usable air capacity of said carburetor to its maximum capacity.

4,169,873

FLUID CIRCULATING DEVICE

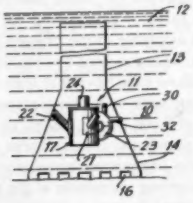
Peter Lipert, Montreal, Canada, assignor to Aero-Hydraulics Corporation, Montreal, Canada

Filed Dec. 13, 1976, Ser. No. 749,670

The portion of the term of this patent subsequent to Jan. 2, 1981, has been disclaimed.

Int. Cl.[2] B01F *3/04*

U.S. Cl. 261—121 R **6 Claims**



1. A device for circulating a fluid in a body of said fluid comprising a vertically extending conduit having an upper discharge opening and a lower inlet opening submerged in said fluid body and a large bubble generator supported at the lower part of said conduit and comprising a gas accumulator tank having a peripheral wall, a top wall, and having an opening at its bottom, an inverted siphon including a vertically extending discharge tubular leg disposed within said tank and registering with an opening in said top wall and terminating in an upper bubble discharge opening directed into said conduit, a lower tubular leg extending from said gas discharge leg below the top thereof outwardly through said peripheral wall proximate the bottom thereof and an outer leg extending upwardly and inwardly into registry with an opening in said peripheral wall proximate the top thereof, and means for delivering a gas into said accumulator tank.

4,169,874

PROCESS FOR PREPARING SHAPED PARTICLES FROM REHYDRATABLE ALUMINA

William E. Bambrick, Old Greenwich, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 723,835, Sep. 16, 1976, Pat. No. 4,065,407. This application Nov. 21, 1977, Ser. No. 853,723

The portion of the term of this patent subsequent to Dec. 27, 1994, has been disclaimed.

Int. Cl.[2] C04B *35/10*

U.S. Cl. 264—44 **8 Claims**

1. In a method for producing low density shaped alumina particles suitable for use as catalysts and catalyst supports comprising preparing an aqueous slurry of an alumina composition containing a substantial portion of a rehydratable alumina, shaping the alumina into desired form, rehydrating to harden the shaped alumina, and curing, drying, and calcining the shaped alumina particles to produce catalyst and catalyst support material, an improvement comprising introducing an aqueous slurry comprising water, an alumina containing a substantial portion of a rehydratable alumina, and a combustible filler to a shaping medium selected from

(a) a water immiscible phase into which droplets of said alumina slurry are introduced to be shaped by surface tension forces into a spherical beaded form, and

(b) tubing of desired cross sectional size and shape to shape said alumina into extrudate form, whereby the alumina is fashioned into a desired configuration, and applying heat to said shaping medium to rehydrate and harden the alumina while it is being subjected to the influence of the shaping medium.

4,169,875

METHOD OF PRODUCING A TUBULAR BODY OF POLYCRYSTALLINE ALUMINA

Harry M. Laska, Euclid, and Nelson Grimm, South Euclid, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 776,758, Mar. 11, 1977, abandoned. This application Jun. 28, 1978, Ser. No. 919,848

Int. Cl.[2] C04B *35/64, 35/10;* **F27B** *9/04*

U.S. Cl. 264—63 **2 Claims**

1. A method of producing a tubular body of sintered polycrystalline alumina consisting essentially of relatively uniform size equiaxed grains of alumina which contains no more than about 150 ppm magnesium and essentially no secondary phase or pores, said alumina body exhibiting improved in-line transmission, which comprises

(a) preparing a mixture of high purity alumina powder having relatively uniform surface area and particle size distribution with a small but effective amount up to 0.1 weight percent finely divided magnesia and a binder,

(b) extruding the mixture to form a green tubular body having a density of at least 30 percent of theoretical density for a single crystal of alumina,

(c) presintering the green tubular body in an oxygen containing atmosphere at a temperature from about 950° C. to

about 1200° C. for a sufficient time period to remove said binder, and

(d) sintering the presintered tubular body at about 1700°–1950° C. in an environment selected from the group consisting of vacuum and hydrogen for a sufficient time period to produce a sintered body of polycrystalline alumina consisting essentially of relatively uniform size equiaxed grains of alumina which contains no more than about 150 ppm magnesium and essentially no secondary phase and pores, said body exhibiting improved optical transmission characterized by especially improved in-line transmission.

4,169,876

PROCESS FOR SPINNING FLAME-RESISTANT ACRYLONITRILE POLYMER FIBERS

Robert S. Irwin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 24, 1978, Ser. No. 899,295
Int. Cl.[2] D01F *6/18*
U.S. Cl. 264—206 **5 Claims**

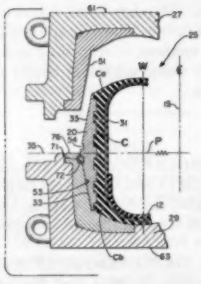
1. A process for spinning flame-resistant acrylonitrile polymer fibers wherein 33–43% by weight of a chlorinated acyclic hydrocarbon containing 60–73% by weight chlorine and 57–67% by weight of an acrylonitrile polymer having an intrinsic viscosity of 1.6–3 is dissolved in a suitable solvent to form a solution containing 25–31% by weight solids which solution is extruded under conventional dry spinning conditions to give fibers which are extracted, drawn and dried.

4,169,877

CENTERING A TIRE IN A MOLD

Richard J. Olsen, Massillon; Max D. Brinkley, North Canton, both of Ohio, and John R. Thiele, Topeka, Kans., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 845,512, Oct. 26, 1977, Pat. No. 4,147,482, which is a continuation-in-part of Ser. No. 738,493, Nov. 4, 1976, abandoned. This application Nov. 13, 1978, Ser. No. 960,277
Int. Cl.[2] B29H *5/02*
U.S. Cl. 264—315 **3 Claims**



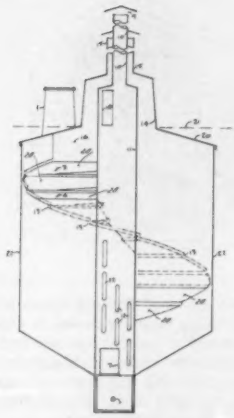
1. A method of making a large tire including preparing for said tire a carcass having a tread receiving region symmetrical with respect to a mid-circumferential centerline of said carcass, shaping the uncured tire carcass to toroidal form and molding and curing said carcass in a curing mold means having two mold members and a third mold member removably disposable coaxially and symmetrically between said first two members; positioning said third member remotely from said curing mold means and coaxially of said carcass shaping means and symmetrically with respect to the mid-circumferential centerline of said carcass, shaping said carcass to engage said third member by a pressure within said carcass sufficient to maintain said third member and said carcass securely engaged to one another, transporting said third member and the carcass therein together to said molding and curing means, placing said third member with said carcass therein in coaxial registry with one of said two mold members and thereby locating the mid-circumferential centerline of said carcass in the mid-circumferential plane of said curing mold means, placing the other of said two mold members in mold closing relation with said one mold member, and thereafter completing the molding and curing of said carcass.

4,169,878

HELICAL COMPOSTER

Alfred B. Etherington, 1909 Iwi Way, Honolulu, Hi. 96816

Filed Jan. 10, 1978, Ser. No. 868,287
Int. Cl.[2] C05F *9/02*
U.S. Cl. 422—184 **19 Claims**



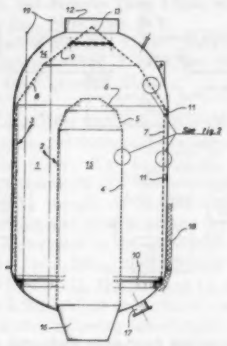
16. A generally vertically disposed waste disposal unit comprising a container which is fixedly located so that it is nonrotatable, a generally vertically disposed hollow tube extending from the top of said container to a bottom of said container, said hollow tube having a central chamber extending therethrough, an air inlet on said tube outwardly of said container permitting fresh oxygen-laden air to enter said chamber, a pair of waste inlets situated proximate the top of said container and leading into a waste material receiving compartment, a ramp forming a waste disposal path located in said waste material receiving compartment extending from proximate said inlet to a bottom of said container, substantially the entire surface of said ramp forming the waste disposal path being inclined downwardly from proximate said inlet to said bottom of said container and having a substantially helical configuration from proximate said inlet to said bottom of said container, each of said waste inlets receiving different types of waste material and depositing the waste material from each of said inlets at different positions on said disposal path, the incline of said ramp being sufficient to permit the waste material to move substantially only by the force of gravity and yet to enable sufficient surface area to be available to the oxygen-laden air so that the waste material can be composted by reaching the bottom of the container, said hollow tube having at least one air outlet opening communicating with said compartment for permitting a continuous flow of fresh oxygen-laden air to enter said compartment, means permitting the discharge of gaseous material generated from the composted waste material from the container, a waste receiving receptacle at the bottom of said tube, said container having a hopper at the bottom, said waste receptacle being located beneath said hopper, and means permitting entry of matter from said hopper to fall by gravity into said waste receptacle.

4,169,879

REACTOR SUITABLE FOR CHEMICAL REACTIONS BRINGING FLUIDS INTO ACTION IN CONTACT WITH A BED OF SOLIDS

Daniel Descoins, Salins; Alain Portes, Cauffry, and Pierre Lafon, St. Avold, all of France, assignors to Societe Chimique des Charbonnages, Courbevoie, France

Filed Sep. 20, 1977, Ser. No. 835,081
Claims priority, application France, Sep. 22, 1976, 76 28540
Int. Cl.[2] B01J *8/02*; C07C *15/09, 15/10*; C07B *3/00*
U.S. Cl. 422—220 7 Claims



1. Reactor for bringing gases or other fluids into contact with a bed of solid catalyst material comprising

means to move the gases or other fluids in an essentially radial direction of flow including

a central perforated tube inside the reactor,

a perforated means enclosing the bed of solid catalyst material comprising a cylindrical bed forming means with a substantially hemispherical reaction zone permeable to the gases or other fluids surmounting said cylindrical bed forming means and formed in between two perforated substantially hemispherical caps,

one of said caps surmounting said central perforated tube, the other of said caps bounding the upper periphery of the bed of catalyst material.

4,169,880

METHOD OF TREATING NITRIC EFFLUENTS

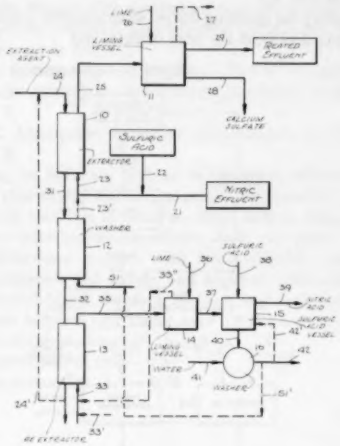
Jean-Pierre Cuer, Francheville le Haut; Antoine Floreancig, and Jean Wojcik, both of St. Genis Laval, all of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed Oct. 26, 1977, Ser. No. 845,606
Claims priority, application France, Nov. 2, 1976, 76 32949
Int. Cl.[2] B01D *11/04*
U.S. Cl. 423—166 14 Claims

1. A process for purifying nitric effluents containing nitric acid, nitrates, or a mixture thereof, which process comprises

(a) treating the nitric effluent with a quantity of sulfuric acid in an amount at least equal to the nitrates, to provide a nitric acid solution;

(b) extracting the nitric acid solution with a liquid extraction agent containing at least one neutral trialkyl phosphoric ester and at least one long-chain alkylamine to load the extraction agent with nitric acid and to provide a sulfate-containing raffinate, and



(c) re-extracting the loaded extraction agent with ammonia to provide a solution containing ammonium nitrate and a regenerated extraction agent.

4,169,881

PROCESS FOR REMOVING DISSOLVED SILICA FROM EXTRACTED PHOSPHORIC ACID

Mitsuo Kikuchi, and Yoichi Hiraga, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Yamaguchi, Japan

Continuation of Ser. No. 695,054, Jun. 11, 1976, abandoned.
This application Nov. 14, 1977, Ser. No. 851,411
Claims priority, application Japan, Feb. 13, 1976, 51/13947
Int. Cl.[2] C01B *25/16*
U.S. Cl. 423—321 R 9 Claims

1. A method of reducing the silica content of extracted phosphoric acid containing substantially no metallic impurities and having a fluorine content of less than 0.3 wt % as F., which comprises:

(a) adjusting the phosphoric acid concentration to from 20 to 65 wt.% as P_2O_5;

(b) adjusting the Si/F atomic ratio in said extracted phosphoric acid to from at least 0.1 to less than 0.2;

(c) contacting said extracted phosphoric acid with silica gel at a temperature of 20°–100° C. to remove the dissolved silica from said extracted phosphoric acid; and

(d) recovering extracted phosphoric acid having a reduced silica content with respect to the acid produced in step a.

4,169,882

PURIFICATION OF PHOSPHORIC ACID WITH OXALIC ACID

Richard C. Sheridan, Sheffield, Ala., assignor to Tennessee Valley Authority, Muscle Shoals, Ala.

Filed Nov. 13, 1978, Ser. No. 959,979
Int. Cl.[2] C01B *25/22*
U.S. Cl. 423—321 R 4 Claims

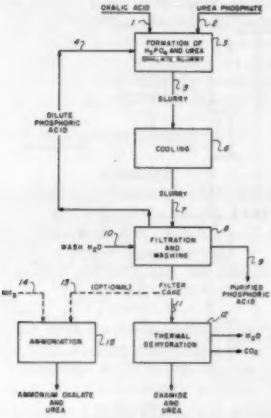
1. A process for purification of wet-process phosphoric acid by use of urea and oxalic acid with coproduction of oxamide which comprises the steps of:

(a) mixing wet-process phosphoric acid with about stoichiometric amounts of urea to effect the preparation of urea phosphate, said resulting urea phosphate containing less than about 50 percent of the congeneric impurities originally present in said wet-process acid;

(b) mixing said resulting urea phosphate with oxalic acid and

with water in the mole ratios 1.9 to 2.1 and 3 to 6, respectively, at a temperature in the range from about 15° C. to about 100° C.;

(c) cooling the resulting slurry, separating the product phosphoric acid from the urea oxalate; and



(d) heating the urea oxalate with a catalytic amount of an acidic phosphate (3 to 15 weight percent) at temperatures ranging from about 150° C. to about 200° C. to form a mixture of urea and oxamide.

4,169,883

PROCESS FOR PREPARING ULTRA-STABLE, HIGH SURFACE AREA ALPHA-ALUMINA

Lawrence L. Murrell, Elizabeth; Dane C. Grenoble, Plainfield, both of N.J., and John P. DeLuca, Chesterfield, Mo., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Jul. 25, 1978, Ser. No. 927,827

Int. Cl.[2] C01F *7/02*

U.S. Cl. 423—628 **14 Claims**

1. A process for preparing ultra-stable, high surface area alpha-alumina which comprises:

(a) impregnating high surface area gamma-alumina extrudate having a narrow average pore size of about 20 to 100 Angstroms with a solution of a sufficient quantity of a carbonaceous material such that following step (b) below, the amount of carbon formed ranges from about 1 to 25 wt. % of alumina;

(b) carbonizing the carbonaceous material at a temperature of about 400° to 1300° C. for a period of time of at least about 0.5 hours in an inert or reducing atmosphere;

(c) converting the gamma-alumina substantially completely to alpha-alumina at a temperature of about 1150° to 1200° C. for a period of time of greater than about 2 hours in an inert or reducing atmosphere; and

(d) removing the carbon at a temperature of about 500° to 1200° C. for a period of time of at least about 0.25 hours in an oxidizing atmosphere, thereby forming an alpha-alumina having a surface area of at least about 20 m^2/g and capable of withstanding temperatures at least as high as about 1000° C. in the presence of steam without substantial loss in surface area.

4,169,884

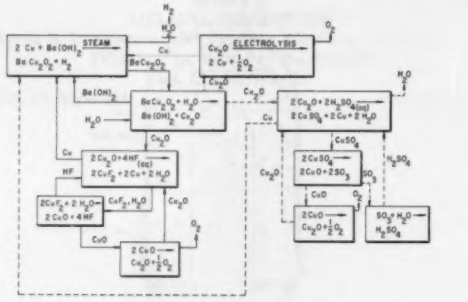
HYDROGEN PRODUCTION FROM WATER USING COPPER AND BARIUM HYDROXIDE

Carlos E. Bamberger, Oak Ridge, Tenn., and Donald M. Richardson, deceased, late of Oak Ridge, Tenn. (by Elizabeth B. Richardson, executrix), assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 17, 1978, Ser. No. 934,664

Int. Cl.[2] C01B *1/02*

U.S. Cl. 423—648 R **7 Claims**



1. The process for producing hydrogen comprising the step of (a) reacting Cu with $Ba(OH)_2$ in the presence of steam to produce hydrogen and $BaCu_2O_2$.

4,169,885

DENTAL AND ORAL HYGIENE PREPARATIONS

Helmut Raaf, Bad Schwalbach, and Helmar R. Wagner, Darmstadt Arheilgen, both of Fed. Rep. of Germany, assignors to Blendax-Werke R. Schneider GmbH & Co., Postfach, Fed. Rep. of Germany

Filed Mar. 14, 1978, Ser. No. 886,469

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1977, 2712161

Int. Cl.[2] A61K *9/20, 9/28, 9/36, 9/48*

U.S. Cl. 424—16 **8 Claims**

1. A filied sucking tablet preparation for dental and oral hygiene comprising a water soluble candy-type based outer shell and an inner filling material, said shell containing a hydrophilic, odontologically active substance which is released as the shell is worn away in the mouth with said active substance being selected from the group consisting of a water soluble inorganic fluoride, an organic fluoride, a fluorosilicate, a zinc compound, a phosphoric acid, a complex-forming polycarboxylic acid, a water-soluble inorganic phosphate, a water-soluble phosphoric acid ester of a polyhydric alcohol, a water soluble antimicrobial agent, and mixtures thereof, and said inner filling material comprising a hydrophobic substance selected from the group consisting of natural fats and waxes, synthetic fats and waxes, phospholipids, abietic acid or a salt thereof, cholesterol, lanosterol, a fatty alcohol, a long chain fatty acid, lipophilic salts or esters of long chain fatty acids, a long chain amine, a peptide, a lipoprotein, a lipoproteic acid, a silicone oil, and mixtures thereof.

4,169,886

FOWL CHOLERA VACCINE AND ITS PREPARATION

Israel Hertman, 14 Biltmore St., Tel-Aviv; Ammon Michael, 50 Shaldag St., Hofit, and Jacob Markenson, 23 Bar Kochba St., Tel-Aviv, all of Israel

Filed Aug. 21, 1978, Ser. No. 935,638

Claims priority, application Israel, Aug. 24, 1977, 52815

Int. Cl.[2] A61K *39/02*

U.S. Cl. 424—92 **4 Claims**

1. A live vaccine aginst Pasteurella multocida, for applica-

tion to poultry by injection, per os or as aerosol, containg an attenuated non-virulent genetically stable strain of Pasteurella multocida which is M-3-G., ATCC No. 31416.

4,169,887

ANTIBIOTICS PRODUCED BY SPECIES OF ACTINOPLANES

Walter D. Celmer, New London; Walter P. Cullen, East Lyme; Charles E. Moppett, Mystic; Mark T. Jefferson, Waterford; Liang H. Huang, East Lyme, all of Conn.; Riichiro Shibakawa, Handa, and Junsuke Tone, Chita, both of Japan, assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 879,607, Feb. 21, 1978, abandoned. This application Aug. 2, 1978, Ser. No. 930,399

Int. Cl.[2] **A61K** *35/00*

U.S. Cl. 424—119 **5 Claims**

1. The antibiotic Compound 48,926 which is soluble in chloroform, ethyl acetate and methylisobutyl ketone; insoluble in heptane, hexane and water; has an optical rotation of $[\alpha]_D = +413°$ at a concentration of 0.097% in chloroform; an average composition by weight of 55.76% carbon, 5.39% hydrogen, 5.36% nitrogen and 33.49% oxygen (by difference); absorption maxima in methanol in the ultraviolet light region of the spectrum at 211, 218_{sh}, 240_{sh}, 295_{sh}, 304 and 500 nm with $E_{1\ cm}^{1\%}$ values of 615, 543, 313, 322, 339 and 17, respectively; and when pelleted in KBr, exhibits characteristic absorption in the infrared region at the following wavelengths in microns: 2.93, 3.38, 5.74, 5.87, 5.95, 6.03, 6.23, 6.42, 6.82, 7.50 and 8.40.

4,169,888

COMPOSITION OF MATTER AND PROCESS

Ladislav J. Hanka, and David G. Martin, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 17, 1977, Ser. No. 842,914

Int. Cl.[2] **C12D** *9/14;* **C07G** *11/00*

U.S. Cl. 424—121 **5 Claims**

1. Antibiotic CC-1065 which is active against Gram-positive and Gram-negative bacteria, and which in its essentially pure form has the following characteristics:

(a) molecular weight of approximately 700;

(b) has the following elemental analysis: C, 61.06; H, 4.92; N, 13.17;

(c) is soluble in dimethylsulfoxide, dimethylformamide, acetone, methylene chloride, ethyl acetate and dioxane;

(d) has a characteristic infrared absorption spectrum when dissolved in a mineral oil mull as shown in FIG. 1 of the drawings;

(e) has a characteristic NMR spectrum as shown in FIG. 2 of the drawings; and,

(f) has a characteristic proton spectrum as shown in FIG. 3 of the drawings.

2. A process for preparing antibiotic CC-1065 which comprises cultivating *Streptomyces zelensis,* having the identifying characteristics of NRRL 11,183, in an aqueous nutrient medium under aerobic conditions until substantial antibiotic CC-1065 activity is imparted to said medium.

4,169,889

ANTIBIOTIC BN-200 SUBSTANCE AND PROCESS FOR PRODUCTION THEREOF

Shoichi Amano, Kawasaki; Shinji Miyadoh, Yokohama; Mitsugu Itoh, Machida; Norio Ezaki, Yokohama; Eiichi Akita, Kamakura, and Yujiro Yamada, Yokohama, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Oct. 4, 1978, Ser. No. 948,459

Claims priority, application Japan, Oct. 4, 1977, 52-118538

Int. Cl.[2] **A61K** *35/00*

U.S. Cl. 424—122 **2 Claims**

1. An antibiotic BN-200 substance having the following properties:

Form and Color: white powder

Elemental Analysis: C 67.46%, H 7.24%, N 7.55%, O 17.75% (balance);

Molecular Weight: 520; determined from the titration value;

Melting Point: Begins to turn brown at 150° C., and begins to decompose at 156° C.;

Specific Rotatory Power: $[\alpha]_D^{20} = -70.7$ (C=1, methanol);

Ultraviolet Absorption Spectrum (in methanol): as shown in FIG. 1;

Infrared Absorption Spectrum (KBr tablet); as shown in FIG. 2;

Solubility in Solvents: Soluble in methanol, ethanol, pyridine, dimethylformamide, acetone, and dimethyl sulfoxide, and insoluble in benzene, ethyl acetate, chloroform, carbon tetrachloride, petroleum ether, and water;

Color Reactions: positive with ferric chloride, potassium permanganate and iodine, and negative with ninhydrin, Sakaguchi, biuret, Fehling, Molisch, and anthrone.

Rf Values in Silica Gel Thin-Layer Chromatography:

Chloroform-Methanol (9:1)—0.57

Benzene-Ethanol (9:1)—0.47

Benzene-Acetone (1:1)—0.76

4,169,890

PHARMACEUTICAL COMPOSITION CONTAINING 5″-AMINO-3′,5″-DIDEOXY-RIBOSTAMYCIN AND INTERMEDIATE COMPOUNDS

Takeo Miyazawa; Yukio Horiuchi, both of Yokohama; Eiichi Akita, Kamakura; Hamao Umezawa, and Sumio Umezawa, both of Tokyo, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

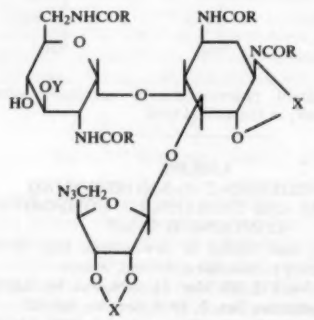
Continuation-in-part of Ser. No. 696,834, Jun. 17, 1976, abandoned. This application May 26, 1977, Ser. No. 800,857

Claims priority, application Japan, Jun. 30, 1975, 50-80094

Int. Cl.[2] **A61K** *31/71;* **C07H** *15/22*

U.S. Cl. 424—180 **5 Claims**

1. A compound represented by the formula (III)



wherein R represents alkoxy having from 1 to 4 carbon atoms and X represents cyclohexylidene or

wherein P and P′ are the same or different and each represents hydrogen, alkyl having 1 to 2 carbon atoms or phenyl, and Y represents alkylsulfonyl, benzylsulfonyl or p-toluenesulfonyl.

5. An antimicrobial composition conatining as an active ingredient 5″-amino-3′,5″-dideoxyribostamycin or a salt thereof with hydrochloric acid, phosphoric acid or acetic acid in association with a pharmaceutically acceptable carrier.

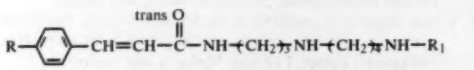
4,169,891

METHOD FOR THE CONTROL OF SWINE DYSENTERY WITH ANTIBIOTIC BM123γ AND CERTAIN DERIVATIVES THEREOF

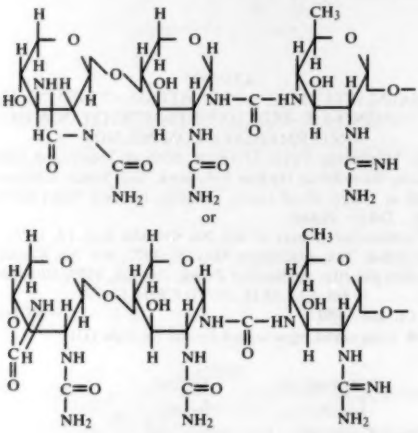
Richard H. Gustafson, Lawrenceville, and Gordon A. Kemp, Princeton, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jul. 17, 1978, Ser. No. 925,661
Int. Cl.[2] A61K *31/71*
U.S. Cl. 424—181 **7 Claims**

1. A method for the control of swine dysentery comprising orally administering to swine a pharmaceutically effective amount of an antibiotic of formula



wherein R_1 is hydrogen, alkyl C_1–C_{10}, alkyl C_2–C_6 mono-substituted with halogen or hydroxy; R is a moiety of



or mixtures thereof; pharmaceutically acceptable salts, or complexes thereof, in the animal feed.

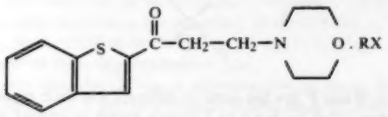
4,169,892

1-(BENZOTHIEN-2'-yl)-3-MORPHOLINO PROPANONES AND THERAPEUTIC COMPOSITIONS CONTAINING SAME

Max F. Robba, and Michel E. Aurousseau, both of Paris, France, assignors to Innothera, Arcueil, France

Division of Ser. No. 672,110, Mar. 31, 1976, Pat. No. 4,079,140. This application Jan. 3, 1978, Ser. No. 866,457
Claims priority, application France, Apr. 3, 1975, 75 10421
Int. Cl.[2] C07D *413/06*
U.S. Cl. 424—248.51 **3 Claims**

1. A compound having the formula:



wherein RX is selected from the group consisting of hydrochloric acid, bromhydric acid, sulphuric acid, phosphoric acid, boric acid, oxalic acid, maleic acid, malic acid, fumaric acid, citric acid, embonic acid, methane sulfonic acid, acetylsalicylic acid, nicotinic acid, parachlorophenoxyacetic acid, parachlorophenoxyisobutyric acid, methyl bromide, methyl iodide, ethyl bromide, butyl bromide and benzyl bromide.

3. A therapeutic composition useful as a blood plaque aggragation inhibitor, a spasmolytic agent, an analgesic agent, an anti-inflammatory agent, a coronary vasodilatatory agent, a cerebral vasodilatatory agent or a peripheral vasodilatatory agent, comprising an effective amount of a compound as claimed in claim **1** in combination with a pharmacologically acceptable carrier.

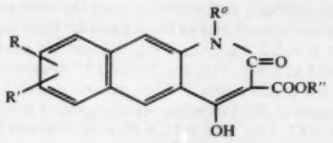
4,169,893

4-HYDROXY-NAPHTHPYRIDINE-2(1H)-ONE-3-CARBOXYLIC ACIDS AND ESTERS

Goetz E. Hardtmann, Morristown, N.J., assignor to Sandoz, Inc., East Hanover, N.J.

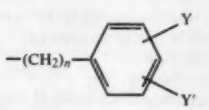
Filed Mar. 13, 1978, Ser. No. 885,628
Int. Cl.[2] A61K *31/47;* **C07D** *221/06*
U.S. Cl. 424—258 **25 Claims**

1. A compound of the formula:



wherein

R^a is hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, cycloalkylalkyl in which the cycloalkyl is of 3 to 6 carbon atoms and the alkyl portion is of 1 or 2 carbon atoms, or



R'' is hydrogen or alkyl of 1 to 4 carbon atoms,

n is 0 or 1,

Y and Y'' are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms or trifluoromethyl, and

R and R' are independently hydrogen, fluoro, chloro, bromo, alkyl of 1 to 4 carbon atoms, or alkoxy of 1 to 4 carbon atoms, with the proviso that the unsaturation in any alkenyl or alkynyl is other than on the alpha carbon atom; or a mono- or di-salt form thereof in which the salt forming cation is a pharmaceutically acceptable cation.

16. A pharmaceutical composition comprising an inert pharmaceutically acceptable carrier and an allergy treating effective amount of a compound of claim **1**.

17. The method of treating allergic conditions due to histamine release comprising administering to a mammal in need of such treatment an allergy treating effective amount of a compound of claim **1**.

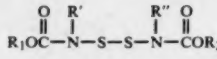
4,169,894

PESTICIDAL UNSYMMETRICAL N-SUBSTITUTED BIS-CARBAMOYLOXY DISULFIDE COMPOUNDS

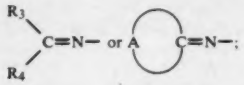
Themistocles D. J. D'Silva, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 28, 1977, Ser. No. 781,987
Int. Cl.[2] A01N *9/12;* **C07D** *339/08, 307/86*
U.S. Cl. 424—277 **54 Claims**

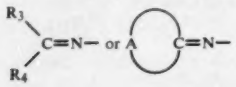
1. A compound of the formula:



wherein:
R′ and R″ are the same and are alkyl having from 1 to 4 carbon atoms;
R_1 is alkynyl,

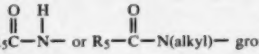


R_2 is other than R_1 and is:
(A) alkyl, alkenyl or alkynyl; or
(B) dihydrobenzofuranyl, naphthyl, tetrahydronaphthyl, benzothienyl, benzodioxalanyl, benzofuranyl, benzodioxanyl all of which may be substituted with one or more alkyl groups; or
(C) either substituted or unsubstituted phenyl wherein the permissible substituents are one or more halo, cyano, nitro, cycloalkyl, alkyl, alkylthio, alkynyl, alkenyl, alkylsulfinyl, alkylsulfonyl, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, amino, alkynylthio, alkenylthio, alkylamino, dialkylamino, alkoxycarbonylamino, trihalomethyl, dialkylaminoalkyleneamino, formamidino, alkoxy, dicyanoethenylene, alkynyloxy, phenoxy, phenyl, 2-oxathianyl, 2-oxathiolanyl, 2-dithianyl, 2-dithiolanyl or 2-dioxalanyl; or



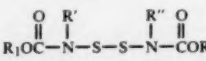
(D)

wherein:
R_3 is hydrogen, alkyl, alkylthio, alkylsulfinyl, alkylsulfonyl or cyano;
R_4 is alkyl, alkylthio, alkylsulfinyl, alkylsulfonyl, alkoxy, alkanoyl, aroyl, alkoxycarbonyl, phenyl, aminocarbonyl, alkylaminocarbonyl or dialkylaminocarbonyl, all of which may be unsubstituted or, except aminocarbonyl, substituted with one or more cyano, nitro, alkylthio, alkylsulfinyl, alkylsulfonyl, alkoxy, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl or R_4 is a

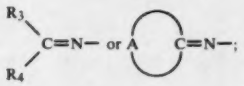


where R_5 is hydrogen, alkyl or alkoxy;
A is a divalent alkylene chain having from 2 to 24 aliphatic carbon atoms completing a five or six membered ring structure which includes one, two or three groups selected from the group consisting of divalent oxygen, sulfur, sulfinyl, sulfonyl, amino, alkylamino, alkylimino or carbonyl groups;
with the proviso that R_2, R_3, R_4 and R_5 substituents individually may not include more than eight aliphatic carbon atoms.

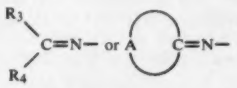
27. A method of controlling, nematodes, insects and mites which comprises subjecting them to a nematocidally, insecticidally or miticidally effective amount of a compound of the formula:



wherein:
R′ and R″ are the same and are alkyl having from 1 to 4 carbon atoms;
R_1 is alkynyl,

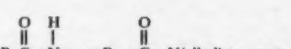


R_2 is other than R_1 and is:
(A) alkyl, alkenyl or alkynyl; or
(B) dihydrobenzofuranyl, naphthyl, tetrahydronaphthyl, benzothienyl, benzodioxalanyl, benzofuranyl, benzodioxanyl all of which may be substituted with one or more alkyl groups; or
(C) either substituted or unsubstituted phenyl wherein the permissible substituents are one or more halo, cyano, nitro, cycloalkyl, alkyl, alkylthio, alkynyl, alkenyl, alkylsulfinyl, alkylsulfonyl, alkylthioalkyl, alkylsulfinylalkyl, alkylsulfonylalkyl, amino, alkynylthio, alkenylthio, alkylamino, dialkylamino, alkoxycarbonylamino, trihalomethyl, dialkylaminoalkyleneamino, formamidino, alkoxy, dicyanoethenylene, alkynyloxy, phenoxy, phenyl, 2-oxathianyl, 2-oxathiolanyl, 2-dithianyl, 2-dithiolanyl or 2-dioxalanyl; or



(D)

wherein:
R_3 is hydrogen, alkyl, alkylthio, alkylsulfinyl, alkylsulfonyl or cyano;
R_4 is alkyl, alkylthio, alkylsulfinyl, alkylsulfonyl, alkoxy, alkanoyl, aroyl, alkoxycarbonyl, phenyl, aminocarbonyl, alkylaminocarbonyl or dialkylaminocarbonyl, all of which may be unsubstituted or, except aminocarbonyl, substituted with one or more cyano, nitro, alkylthio, alkylsulfinyl, alkylsulfonyl, alkoxy, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl or R_4 is a



where R_5 is hydrogen, alkyl or alkoxy;
A is a divalent alkylene chain having from 2 to 24 aliphatic carbon atoms completing a five or six membered ring structure which includes one, two or three groups selected from the group consisting of divalent oxygen, sulfur, sulfinyl, sulfonyl, amino, alkylamino, alkylimino or carbonyl groups;
with the proviso that R_2, R_3, R_4 and R_5 substituents individually may not include more than eight aliphatic carbon atoms.

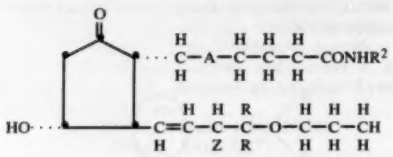
4,169,895

ANTISECRETORY 16,16-DIMETHYL-17-OXAPROSTAGLANDINS

Hans-Jürgen E. Hess, Old Lyme, and Michael R. Johnson, Gales Ferry, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 727,463, Sep. 28, 1976, abandoned. This application Sep. 2, 1977, Ser. No. 830,159
Int. Cl.[2] **C07C** *103/19, 143/75;* **A61K** *31/16, 31/18*
U.S. Cl. 424—320 **10 Claims**

1. A compound having the structure:



wherein:

R^2 is selected from the group consisting of alkylsulfonyl having one to four carbon atoms, alkanoyl having two to five carbon atoms and benzoyl;

A is ethylene or cis-vinylene;

Z is alpha-hydroxy or beta-hydroxy;

each R is methyl;

and the pharmacologically acceptable salts thereof when R^2 is alkylsulfonyl.

9. A method to combat peptic ulceration which comprises administering orally or intravenously to a patient in need of such treatment an antisecretory effective amount of a prostaglandin of claim **1**.

4,169,896

CONTROL OF COCCIDIAL DISEASES BY TREATMENT OF ANIMAL EXCRETA WITH SECONDARY AMINES

René Muntwyler, Hofstetten, and Clemens Kocher, Therwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Mar. 7, 1978, Ser. No. 884,303

Claims priority, application Switzerland, Mar. 9, 1977, 2945/77

Int. Cl.[2] **A61K** *31/13;* **A01N** *9/20;* **A61L** *13/00*

U.S. Cl. 424—325 **2 Claims**

1. A method for controlling coccidial diseases which comprises treating oocyst-bearing material excreted by the the animals with an effective amount of a compound of the formula

R—NH—R′

wherein

R represents a straight-chain or branched alkyl of from 5 to 18 carbon atoms, or a monocyclic cycloalkyl or monocyclic cycloalkylalkyl of up to 12 carbon atoms and which contains at least 5 carbon atoms in the cyclic moiety, and

R′ represents a straight-chain or branched alkyl of from 1 to 9 carbon atoms, monocyclic cycloalkyl of from 3 to 6 carbon atoms, cyclopropylmethyl, cyclohexylmethyl or cyclohexylpropyl,

and wherein R and R′ together contain at least 10 carbon atoms, or a salt of said compound with hydrochloric acid, hydrobromic acid, acetic acid, lactic acid, citric acid, sorbic acid, undecylenic acid or glucuronic acid.

4,169,897

2,7-BIS-BASIC ETHERS OF 9-PHENANTHROL AND 9-LOWERALKOXY PHENANTHROL

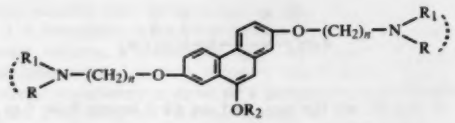
Donald R. Meyer; Arthur D. Sill, both of Cincinnati, and Paul L. Tiernan, Hamilton, all of Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Division of Ser. No. 317,237, Dec. 21, 1972, abandoned. This application Nov. 11, 1976, Ser. No. 740,804

Int. Cl.[2] **A01N** *9/20;* **C07C** *93/06*

U.S. Cl. 424—330 **8 Claims**

1. A 2,7-bis-basic ether of 9-phenanthrol an 9-lower-alkoxyphenanthrol having the formula:



wherein n is an integer of from 2 to 6; R and R_1 are each selected from the group consisting of hydrogen, lower alkyl having from 1 to 6 carbon atoms, cycloalkyl having from 3 to 6 carbon atoms, alkenyl having from 3 to 6 carbon atoms in which the unsaturation is in a position other than the 1-position of the alkenyl group, and when R and R_1 are taken together with the nitrogen atom to which they are attached represent the pyrrolidinyl, piperidino or morpholino group; R_2 is selected from the group consisting of hydrogen or lower alkyl having from 1 to 4 carbon atoms; and the pharmaceutically acceptable acid addition salts thereof.

5. A method of preventing viral infections which comprises the daily prophylactic administration of from 0.1 milligrams to 500 milligrams per kilogram of body weight of a compound of claim **1** to a host susceptible to infection by pathogenic viral agents.

4,169,898

ANIMAL REPELLANT MIXTURE OF UNDECANONE-2 AND 3-PHENYLPROPENAL

Donald A. Haase, Penfield, and Frank E. Tamalenus, Fairport, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 815,484, Jul. 14, 1977, abandoned. This application Jan. 11, 1978, Ser. No. 868,601

Int. Cl.[2] **A01N** *9/24*

U.S. Cl. 424—331 **8 Claims**

1. An animal repellant composition comprising from about 5% to about 30% by weight of an active ingredient and from about 70% to about 95% by weight of an inert carrier therefor; said active ingredient being an olfactory repellant comprising a mixture of 1 part of undecanone-2 with 1 to 4 parts of 3-phenylpropenal.

4,169,899

PENICILLAMINE COMPOUNDS

Masami Shiroki, Nakatsu; Yutaka Maruyama, Yoshitomimachi, and Kazuhiro Goto, Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

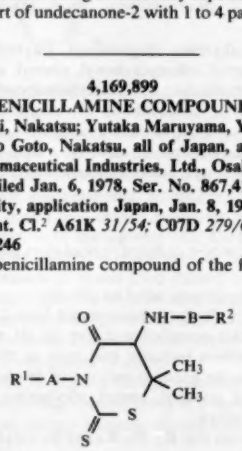
Filed Jan. 6, 1978, Ser. No. 867,413

Claims priority, application Japan, Jan. 8, 1977, 52-1008

Int. Cl.[2] **A61K** *31/54;* **C07D** *279/06*

U.S. Cl. 424—246 **17 Claims**

1. A cyclic penicillamine compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof wherein R^1 represents hydrogen, C_{1-4} alkyl, C_{2-3} alkenyl, C_{1-4} alkoxycarbonyl, phenyl, diphenylmethyl or a group of the formula: $(R^4)(R^5)N—$ wherein R^4 and R^5 represent each C_{1-4} alkyl, phenyl or phenyl-C_{1-2} alkyl; R^2 represents C_{1-12} alkyl, phenyl, phenyl-C_{1-2} alkyl or phenyloxy-C_{1-2} alkyl; A represents alkylene of 1 to 5 carbon atoms; and B represents —C(=O)— or —C(=O)O—; in which definitions the term "phenyl" or "phenyl-C_{1-2} alkyl" in each occurrence means that it may be substituted by at least one substituent at any posi-

tion(s) on the phenyl nucleus, each substituent being independently selected from C_{1-4} alkyl, C_{1-4} alkoxy, halogen, nitro, trifluoromethyl, methylenedioxy, C_{2-3} acyl and acetoxy.

4,169,900

USE OF MALTOL-2-METHYL PENTENOATES FOR AUGMENTING OR ENHANCING THE FLAVOR OR AROMA OF A FOODSTUFF

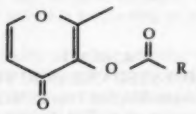
Cynthia J. Mussinan, Bricktown; Braja D. Mookherjee, Holmdel, both of N.J.; Alfred E. Goossens, New York, N.Y., and Manfred H. Vock, Locust, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 884,382, Mar. 8, 1978, Pat. No. 4,139,541. This application Sep. 5, 1978, Ser. No. 939,728

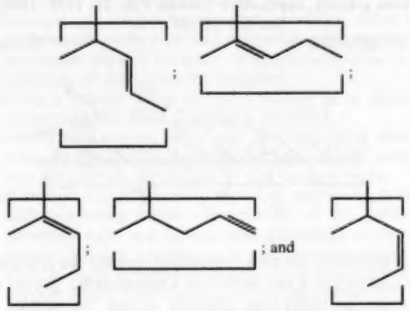
Int. Cl.[2] A23L *1/226, 1/235*

U.S. Cl. 426—536 **6 Claims**

1. A process for augmenting or enhancing the flavor or aroma of a foodstuff which comprises adding thereto from 0.01 parts per million up to about 50 parts per million by weight based on the weight of said foodstuff of a maltyl-2-methyl pentenoate defined by the structure:



wherein R is a moiety selected from the group consisting of:



4,169,901

MEATY-FLAVORED DEEP-FAT FRYING COMPOSITIONS

David S. Kravis, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 1, 1978, Ser. No. 882,481

Int. Cl.[2] A23D *5/00*

U.S. Cl. 426—601 **13 Claims**

1. A deep-fat frying composition suitable for imparting a meaty flavor to foodstuffs fried therein; comprising:

A. from about 80% to 98.9% by weight of the composition of a base fat containing at least about 95% by weight of the base fat of an edible triglyceride having acyl groups in the range of from 16 to 22 carbon atoms, and wherein the base fat has a smoke point exceeding about 350° F., and wherein the Iodine Value of the base fat ranges from 30 to about 150;

B. from about 0.02% to 10% by weight of the composition of volatile, artificial meat-like flavorant which is soluble in the base fat to an extent of at least 10% by weight of the flavorant based on the total weight of the composition at 70° F.;

C. from about 1% to 10% by weight of the composition of a stabilizing agent to prolong the flavor delivery frylife which is an undeodorized edible oil selected from the group consisting of coconut oil, palm-kernel oil, cohune oil, muru muru oil, ucuhuba tallow, and babassu oil.

4,169,902

METHOD OF REPELLING ANIMALS AND BIRDS

Charles F. De Long, Washington, D.C., assignor to United States Trading International, Inc., Washington, D.C.

Continuation-in-part of Ser. No. 614,925, Sep. 19, 1975, Pat. No. 4,094,845. This application Jul. 20, 1977, Ser. No. 817,440

Int. Cl.[2] B05D *1/02;* **A01N** *9/02, 9/24, 9/70*

U.S. Cl. 427—4 **23 Claims**

1. A method for repelling animals or birds from a grassy, wooded or paved area consisting of applying to a locus to be protected an animal- or bird-repelling amount of a composition consisting essentially of an aqueous solution or dispersion of a carboxylated hydrophilic acrylic copolymer, a cross-linking agent for the carboxyl of the carboxylated hydrophilic acrylic copolymer, and a stabilizingly effective amount of an ultraviolet-absorbing agent and an animal- or bird-repelling amount of an animal or bird repellant.

4,169,903

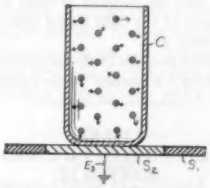
ELECTROSTATIC PROCESS FOR COATING ELECTRICALLY CONDUCTIVE OBJECTS SUCH AS BEVERAGE CANS

Addison B. Scholes, Muncie, Ind., assignor to Ball Corporation, Muncie, Ind.

Filed Jun. 10, 1977, Ser. No. 805,478

Int. Cl.[2] B05D *1/06*

U.S. Cl. 427—28 **9 Claims**



1. A process for coating an electrically conductive object comprising:

electrically charging said object to provide it with a charge of a first polarity;

providing a dispersion in air of particles of powdered coating material;

providing said particles with an electrostatic charge of said first polarity and similar magnitude to that of said charged object;

clouding said charged particles about such portion of the charged object as is to be coated thereby;

suddenly substantially changing at least the magnitude of said charge of said object while said charged particles surround said portion of the object to be coated, whereupon said charged particles are attracted to and are deposited upon said portion of said object.

4,169,904

PREPARATION OF POLYMER MONOMOLECULAR FILMS

George Czornyj, Wappingers Falls, N.Y.; Jerome D. Swalen, Los Gatos, Calif., and Anthony W. Wu, Fishkill, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 5, 1978, Ser. No. 867,057
Int. Cl.[2] B05D 3/06
U.S. Cl. 427—44 5 Claims

1. A process for lubricating or passivating a solid substrate surface comprising applying thereto a monomolecular layer of material having the formula

$$(CF_3-(CF_2)_n-(CH_2)_m-X-COO\rightarrow)_2M \text{ or}$$

$$(CF_3-(CF_2)_n-(CH_2)_m-X-(CH_2)_L-COO\rightarrow)_2M$$

wherein n is 6 to 20, each of m and L is 6 to 10, X is —CH=CH— or —C≡C—, and M is a divalent cation, and polymerizing said layer in situ by exposing it to radiation.

4,169,905

PROCESS FOR LUBRICATING TEXTILE THREADS

Jean-Claude Delaval, Lyons, and Joseph Stagnetto, Oullins, both of France, assignors to Rhone-Poulenc Industries, Paris, France

Filed Nov. 7, 1977, Ser. No. 849,212
Claims priority, application France, Nov. 30, 1976, 76 36005
Int. Cl.[2] D01D 11/06; D01F 11/04; D01G 29/00
U.S. Cl. 427—177 21 Claims

1. A process for lubricating textile threads by treatment in an aqueous bath containing a lubricating agent comprising the steps of:

(a) impregnating moist bobbins of the textile thread which have been moistened with an essentially aqueous liquid with an aqueous bath liquid containing dispersed therein an amount of from about 6 to about 20%, by weight, of at least one organosilicon polymer lubricating agent at a temperature of between about 15° and about 30° C.

(b) removing the impregnated bobbins of thread from the bath liquid;

(c) removing from the impregnated bobbins such an amount of adhering bath liquid that the resulting moist bobbins of thread retain only an amount of from about 25 to about 70%, by weight, of the bath liquid relative to the weight of the dry thread; and,

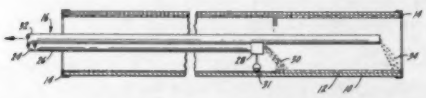
(d) drying the moist bobbins of thread sufficiently to substantially remove their adsorbed water content.

4,169,906

WEAR RESISTANT COATED PIPE AND METHOD OF MAKING IT

James R. Hallstrom, Brookfield; Kenneth G. Klatt, Brown Deer, and Ronald L. Walling, Sussex, all of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Continuation of Ser. No. 613,292, Sep. 15, 1975, abandoned. This application Apr. 6, 1978, Ser. No. 894,113
Int. Cl.[2] B05D 7/22, 3/02
U.S. Cl. 427—183 7 Claims



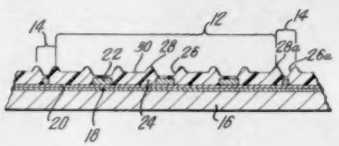
1. A method of forming a wear-resistant pipe for use in the transmission of abrasive fluids, such as coal slurries and the like, including the steps of disposing the pipe about a generally horizontal axis and in a state to be rotated, providing a coating material which includes a cross-linkable thermosetting resin, a separate curing agent for the resin, and a separate source of abrasion-resistant particles, rotating the pipe about its horizontal axis at a rate of speed that will centrifuge the coating about the inside thereof, transporting the resin, the curing agent and the particles separately along the inside of the pipe out of contact therewith to a point of initial application adjacent one end of the pipe, mixing the resin and curing agent at a point of mixture inside the pipe to form a matrix, applying the matrix to the inside of the pipe progressively, commencing at the initial point of application, and while the pipe is being rotated, supplying the particles to the matrix at said initial point of application progressively and after the point of mixture where the matrix is initially formed, causing relative axial movement of the point of initial application progressively toward the other end of the pipe to thereby apply a uniform deposit of particles progressively with the matrix on the inner surface of the pipe, and allowing the mixture of matrix and particles to cure and adhere to the inner surface of the pipe to form a finished lined pipe product.

4,169,907

SIMULATED CERAMIC TILE

John C. Barker, Cowansville, and Ivan P. McLaughlin, Dunham, both of Canada, assignors to J. J. Barker Company Limited, Quebec, Canada

Continuation-in-part of Ser. No. 550,875, Feb. 19, 1975, abandoned. This application Jun. 21, 1977, Ser. No. 808,662
Claims priority, application Canada, Feb. 21, 1975, 213914
Int. Cl.[2] B41M 3/00
U.S. Cl. 427—264 22 Claims



1. A method of forming a simulated ceramic tile comprising

(a) applying to a flat surface of a non-metallic, porous substrate, an under-coat effective to seal the surface and provide a coloured, printable base,

(b) printing on said printable base a pattern composed of ink lines of a coloured drying ink containing 0.75 to 5% by weight of an organic silicone oil,

(c) allowing said drying ink to dry,

(d) applying to said printable base, over said printed pattern, a colouring pigment-containing liquid top coat composition of a resinous, silicone-free, film-forming material in a volatile organic vehicle, said top coat composition containing from 0.75% to 2.0% of colouring pigment based on the weight of top coat composition,

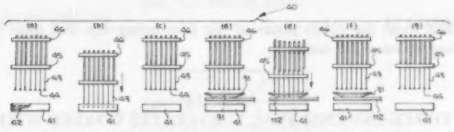
(e) allowing said silicone-containing ink to repel said liquid to form ridges of the liquid adjacent the printed pattern, said printed pattern being clearly visible, and subsequently

(f) drying and baking the substrate to fix said liquid material as a hard, colouring pigment-containing, resinous top coat defining a contour of valleys, hills and plains, wherein the intensity of colour in the top coat varies with the variation in the contour, said top coat remaining on the printed pattern in a thickness less than 1 mil such that the colour of the ink is not obscured; said colour in the top coat providing a contrast with the colour in the under-coat and with the colour in the printed pattern to simulate a ceramic appearance.

4,169,908
METHOD AND APPARATUS FOR DECORATING SURFACES OF CERAMIC WARE

David G. Hatfield, La Canada, Calif., assignor to Interpace Corporation, Parsippany, N.J.

Continuation of Ser. No. 660,489, Feb. 23, 1976, abandoned.
This application Jun. 14, 1978, Ser. No. 915,407
Int. Cl.[2] B05D *5/00*
U.S. Cl. 427—287 5 Claims



1. In a method of applying suspended films of selected colorant composition material for decorating a surface of a ceramic body, the suspended film being carried by elongated decorating members, each member being provided independent relative movement in one vertical direction with respect to a vertically, linearly movable supporting means, comprising the steps of:

supporting a plurality of independently, vertically, reciprocally, nonrotationally movable decorating members having shaped openings corresponding to a selected pattern along parallel vertical paths;

lowering said supporting means and said decorating members along said vertical paths for immersion of said openings into a colorant composition material contained in a receptacle below said members;

lifting said support means and said decorating member along said vertical paths from said receptacle while maintaining suspended films of colorant composition material in said openings of the decorating members;

moving a ceramic body having a surface to be decorated underneath the lifted decorating member;

lowering said support means and said decorating members along said vertical paths to deposit said colorant composition material on the surface of said ceramic body;

said second step of lowering including continuing to lower said supporting means after contact of the decorating members with said surface and providing unrestricted relative vertical movement in one direction along said vertical paths between each decorating member and said support means whereby each decorating member contacts said surface, under gravitational forces acting on each decorating member, for deposit of the suspended film;

raising said support means and subsequently said decorating members to move said decorating members away from said surface;

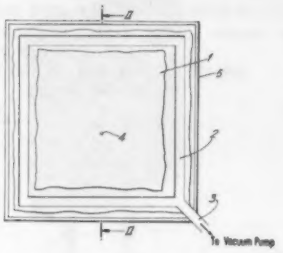
and removing the decorated ceramic body from beneath the plurality of raised decorating members and support means.

4,169,909
ARTIFICIAL AND NATURAL STRUCTURES IMPREGNATED BY USING A FLEXIBLE, FLUID IMPERMEABLE COVERING

James Milne, Wigton, England, assignor to Balfour Beatty Limited, Surrey, England

Filed Oct. 25, 1977, Ser. No. 845,036
Int. Cl.[2] E02D *37/00*
U.S. Cl. 427—294 11 Claims

1. A method of strengthening artificial and natural structures having voids in at least a part of the structure adjacent an exposed surface of the structure, which method comprises closely fitting over the exposed surface a flexible fluid-impermeable covering having adjacent its boundary edges an endless hollow wall that surrounds and opens towards said covered surface; sealing boundary edges of the covering to the structure to form a substantially fluid-tight enclosure incorporating the hollow wall; evacuating air and any other fluid from the hollow wall and from voids adjacent said covered surface;



allowing hardenable material in a liquid or semi-liquid state to enter into the evacuated voids until the hardenable material appears at openings of voids in said covered surface; and allowing the hardenable material to set.

4,169,910
MULTILAYER FILM INCLUDING POLYOLEFIN LAYERS AND A POLYBUTYLENE LAYER USEFUL FOR THE PRODUCTION OF BAGS

James J. Graboski, Lisle, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jun. 28, 1978, Ser. No. 919,852
Int. Cl.[2] B32B *1/02, 27/08, 27/32;* B65D *29/06*
U.S. Cl. 428—35 30 Claims

1. A multilayer film suitable for use in fabricating a trash bag, includes a first outer layer comprising a first extruded heat sealable polyolefin; a second outer layer comprising a second heat extruded sealable polyolefin; and an extruded core layer comprising a blend of a polybutylene homopolymer having a melt flow of from about 0.4 to about 10.0 decigrams per minute, and a polypropylene homopolymer or copolymer having a melt flow of from about 0.5 to about 15.0 decigrams per minute.

15. A bag fabricated from the multilayer film of claim 1.

16. A method for producing a multilayer film, comprising the steps of supplying to three separate extruders respectively first and second heat sealable polyolefins, and a blend of polybutylene homopolymer, and a polypropylene homopolymer or copolymer with each extruder feeding a separate channel of a multilayer die and extruding through a single die gap a multilayer film including first and second outer layers of said first and second polyolefins, respectively, and a core layer including said blend.

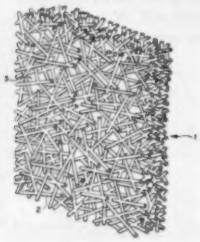
4,169,911
POROUS CARBON FIBER MATERIAL WITH A THIN METAL FILM COVERING EACH FIBER

Kazuo Yoshida; Shinsaku Tada, and Atsushi Kitamura, all of Otsu, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Apr. 26, 1978, Ser. No. 900,184
Claims priority, application Japan, May 10, 1977, 52-53443
Int. Cl.[2] D04H *1/58*
U.S. Cl. 428—36 15 Claims

1. A porous carbon fiber material comprising a multiplicity of cut carbon fibers having a diameter of 3 to 20 microns, said fibers being substantially completely and randomly dispersed with the fibers overlaid and intersecting each other, a binder contacting said fibers at their points of intersection to form a porous structure including a multiplicity of pores which extend continuously from one surface of said material to the other, said binders being selected from the group consisting of phenolic resin, epoxy resin, furan resin, xylenol-formaldehyde resin, urea resin, melamine resin, aniline-formaldehyde resin, Friedel-

Crafts resin, unsaturated polyester resin, polyvinylalcohol, polyacrylic resin, polyvinylbutyral, polyvinylpyrrolidone,



polyvinylacetate, polystyrene and polyisobutylene, and a thin metal film covering each of said fibers.

4,169,912

IRON OXIDE MAGNETIC PIGMENTS FOR THE PRODUCTION OF MAGNETIC COATINGS

Eduard Schönafinger, Ludwigshafen; Paul Deigner, Weisenheim; Manfred Ohlinger, Frankenthal; Helmut Jakusch, Ludwigshafen; Jürgen Amort, Troisdorf-Sieglar; Heinz Nestler, Troisdorf-Eschmar; Claus-Dietrich Seiler, Rheinfelden, and Otto Ambros, Mannheim, all of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Continuation of Ser. No. 729,445, Oct. 4, 1976, abandoned. This application Nov. 3, 1977, Ser. No. 848,437

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1975, 2543962

Int. Cl.[2] B32B *9/04*

U.S. Cl. 428—145 **9 Claims**

1. In a magnetic tape comprising a non-magnetic or non-magnetizable substrate and an adhering iron oxide pigment, the improvement wherein said iron oxide pigment is one which has been pretreated before dispersion thereof in a binding agent with an acid or alkaline solution of a silane of the formula

$$R_nSi(OR')_{4-n}$$

wherein

R is a straight or branched alkyl group having 1 to 18 carbon atoms or a straight or branched alkenyl group of 2 to 18 carbon atoms which alkyl or alkenyl group can contain an oxygen atom in the chain or an aryl group

R′ is a straight or branched chain C_1–C_{18} alkyl group which can contain an oxygen atom in the chain

n=1 to 3

or its hydrolysis product and thereafter dried.

4,169,913

COATED TOOL STEEL AND MACHINING TOOL FORMED THEREFROM

Mitsunori Kobayashi; Yoshihiko Doi; Masaaki Tobioka, and Takaharu Yamamoto, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Japan

Filed Mar. 1, 1978, Ser. No. 882,893

Int. Cl.[2] B32B *15/18*

U.S. Cl. 428—217 **5 Claims**

1. A coated tool steel comprising a tool steel substrate and at least one layer of a hard film overcoated on the substrate, the film consisting of a B-1 type solid solution selected from the group consisting of carbides, nitrides and carbonitrides of at least one of titanium, zirconium or hafnium, and the breadth of the peak, at half maximum intensity, of the Cu-Kα ray diffrac-

tion from the (200) plane of the film being not less than 0.4 degree on a 2 θ scale.

4,169,914

THREE-DIMENSIONAL SUBSTRATES COATED WITH THE REACTION PRODUCT OF AN AMINO RESIN AND A HIGH MOLECULAR WEIGHT SULFONIC ACID

Lawrence V. Gallacher, East Norwalk, Conn., assignor to King Industries, Inc., Norwalk, Conn.

Division of Ser. No. 683,777, May 6, 1976, Pat. No. 4,098,950, which is a division of Ser. No. 466,079, May 1, 1974, Pat. No. 3,979,478. This application Apr. 12, 1978, Ser. No. 895,655

Int. Cl.[2] B32B *15/08, 27/08, 17/10, 27/10*

U.S. Cl. 428—290 **13 Claims**

1. A three-dimensional substrate comprising a material selected from the group consisting of metal, glass, cloth, paper and plastic, the surface of which has a coating thereover comprising a reaction product of a convertible amino resin and a catalytically effective amount of a polyalkylaromatic polysulfonic acid having a molecular weight of at least about 500.

4,169,915

FIRE RESISTANT FOAM PRODUCTS

Glenn A. Heitmann, Morrison, and Milton F. Trosper, Jr., Littleton, both of Colo., assignors to Johns-Manville Corporation, Denver, Colo.

Continuation of Ser. No. 729,499, Oct. 4, 1976, abandoned. This application Apr. 12, 1978, Ser. No. 895,567

Int. Cl.[2] B32B *3/26*

U.S. Cl. 428—310 **18 Claims**

5. A heat resistant foamed material comprising a cellular foamed resin body having applied to at least one face thereof a facing comprising a mat having incorporated therein talc in an amount of 0.1 to 0.5 parts by weight per part by weight of said mat.

4,169,916

STEEL SHEETS AND METHOD OF TREATING STEEL SHEETS

Nobuyuki Tsutsui, Kudamatsu; Hitoshi Omura, Hofu; Takashi Mizobe, Kudamatsu; Katsumi Kanda, Kudamatsu, and Terunori Fujimoto, Tokyo, all of Japan, assignors to Toyo Kohan Co., Ltd., Japan

Continuation of Ser. No. 701,605, Jul. 1, 1976, abandoned. This application Nov. 28, 1977, Ser. No. 855,342

Claims priority, application Japan, Dec. 22, 1975, 50–151993

Int. Cl.[2] B32B *9/04*

U.S. Cl. 428—447 **13 Claims**

1. A method of treating steel sheets which have good corrosion resistance after forming, which comprises coating a steel sheet with an effective amount to inhibit corrosion, of a solution which consists essentially of water and:

(a) water-soluble or water-dispersible lithium silicate at a concentration of 2 to 250 g/l, which lithium silicate is a mixture of silicic acid or silicate and lithium salt in a molar ratio of 20:1 to 1:1,

(b) at least one water-soluble or water-dispersible saturated or unsaturated fatty acid compound, higher alcohol wax, polyethylene type resin, or silicone type resin at a concentration of 1 to 250 g/l,

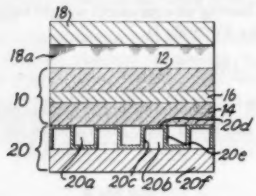
(c) at least one water-soluble phosphate or phosphoric acid at a concentration of 1 to 100 g/l.

4,169,917

ELECTROCHEMICAL CELL AND SEPARATOR PLATE THEREOF

Bernard S. Baker, Brookfield Center, and Dilip J. Dharia, Danbury, both of Conn., assignors to Energy Research Corporation, Danbury, Conn.

Filed Jul. 10, 1978, Ser. No. 923,369
Int. Cl.[2] H01M 8/04
U.S. Cl. 429—26 **11 Claims**



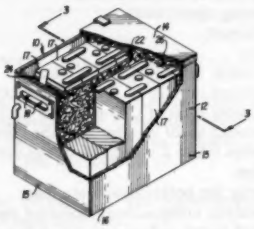
1. An electrochemical cell comprising an electrolyte, an electrode contiguous with said electrolyte and plate structure defining first flow passages in flow communication with said electrolyte and second flow passages in flow isolation with respect to said electrolyte and said second passages being bounded by surface thereof contiguous with said electrode.

4,169,918

ARRANGEMENT FOR LIMITING PRESSURE DEVELOPED IN A CLOSED CONTAINER

George E. Moore, Scotia, N.Y., assignor to General Electric Company, Gainesville, Fla.

Filed Apr. 24, 1978, Ser. No. 899,581
Int. Cl.[2] H01M 10/52
U.S. Cl. 429—57 **21 Claims**



1. An arrangement for limiting the pressure increase associated with the formation of a gaseous mixture and the combination of said gaseous mixture to form a gaseous product at high pressure, said arrangement comprising:

(a) an enclosed container;

(b) said container including a source of said gaseous mixture;

(c) said container further including a free space adjacent said source of gaseous mixture; and

(d) a heat absorbent material disposed in said free space and occupying not less than about 80% by volume of said free space as packed, the product of the specific heat and true density of said material being at least about 0.4 cal/cm^3-°C;

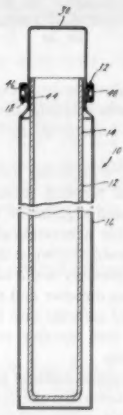
(e) said material being present in a volume fraction, as packed, of not less than about 0.05 and effecting a substantial reduction in the temperature normally resulting from the combination of said gaseous mixture to thereby reduce the pressure resulting from said combination to a level below that capable of causing rupture of said container.

4,169,919

DOUBLE SEAL FOR SODIUM SULFUR BATTERY

Armenag Topouzian, Birmingham, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 26, 1978, Ser. No. 954,966
Int. Cl.[2] H01M 2/00
U.S. Cl. 429—104 **3 Claims**



1. In a sodium sulfur battery an improved seal for sealing two compartments from one another, the two compartments being separated from one another at least in part by a tube of ceramic material of circular cross section having an inner surface and an outer surface, said seal comprising:

a lower can member encircling and spaced from the tube's outer surface, said lower can member having a top portion formed in the shape of a flange having a flat surface extending outwardly from a position closely adjacent the tube's outer surface to an extended position and then upwardly to a terminal position to thereby define a lower circumferential notch adjacent the tube's outer surface;

an upper can member encircling and spaced from the tube's outer surface, said upper can member having a bottom portion formed in the shape of a flange having a flat surface extending outwardly from a position closely adjacent the tube's outer surface to an extended position and then downwardly to a terminal position to thereby define a lower circumferential notch adjacent the tube's outer surface;

a soft deformable lower ring element received in said lower circumferential notch;

a soft deformable upper ring element received in said upper circumferential notch;

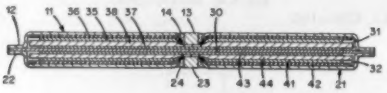
an electrically insulated, pressure applying element having (a) a lower pressure applying surface engaging said lower ring element in said lower circumferential notch, and (b) an upper pressure applying surface engaging said upper ring element in said upper circumferential notch; and

pressure applying and electrical insulating means for engaging said flanges formed on said top portion of said lower can member and said bottom portion of said upper can member to apply pressure thereto and to electrically insulate the same so that said pressure applying element deforms both said lower ring element and said upper ring element in their respective circumferential notches into sealing contact with the tube's outer wall and said circumferential notches and to electrically insulate said lower can member from said upper can member.

4,169,920
HERMETICALLY SEALED ELECTROCHEMICAL BATTERY

James Epstein, Sharon, Mass., assignor to GTE Laboratories Incorporated, Stamford, Conn.

Filed Dec. 11, 1978, Ser. No. 967,950
Int. Cl.[2] H01M 6/14
U.S. Cl. 429—154 6 Claims



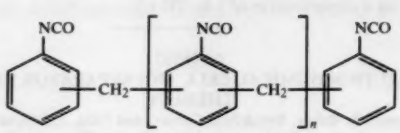
1. A hermetically sealed electrochemical battery comprising first and second generally similar dish-shaped housing members of conductive material, each having an outwardly turned rim;
a thin, flat, conductive collector member;
the first and second housing members and the collector member being sealed together at the rims of the housing members to provide a hermetically sealed enclosure including a first chamber between the first housing member and the collector member and a second chamber between the second housing member and the collector member;
a first thin preformed cathode disc within the first chamber adjacent to said first housing member and electrically insulated therefrom;
a first conductive terminal member passing through said first housing member centrally thereof and electrically insulated therefrom, and making electrical contact to said first cathode disc to permit electrical connection thereto from the exterior of the first chamber;
a first thin anode disc within the first chamber in electrical contact with the collector member;
a first thin porous separator interposed between the first cathode disc and the first anode disc to prevent physical contact therebetween;
a second thin preformed cathode disc within the second chamber in electrical contact with the collector member;
a second thin anode disc within the second chamber adjacent to said second housing member and electrically insulated therefrom;
a second conductive terminal member passing through said second housing member centrally thereof and electrically insulated therefrom, and making electrical contact to said second anode disc to permit electrical connection thereto from the exterior of the second chamber;
a second thin porous separator interposed between the second cathode disc and the second anode disc to prevent physical contact therebetween; and
liquid electrolytic solution in said first chamber in contact with the first cathode disc and the first anode disc and in said second chamber in contact with the second cathode disc and the second anode disc.

4,169,921
POLYISOCYANURATE

Ernest K. Moss, St. Petersburg; Alberto DeLeon, Clearwater, and Michael J. Skowronski, Largo, all of Fla., assignors to The Celotex Corporation, Tampa, Fla.

Continuation of Ser. No. 322,842, Jan. 11, 1973, abandoned. This application Oct. 13, 1976, Ser. No. 732,046
Int. Cl.[2] C08G 18/14, 18/22, 18/76; B01J 23/04
U.S. Cl. 521—125 13 Claims

1. A process for producing a polyisocyanurate foam comprising:
I. reacting at 0 to 50° C.:
A. polymethylene polyphenylisocyanate which is a mixture of polymethylene polyphenylisocyanates of Formula I:

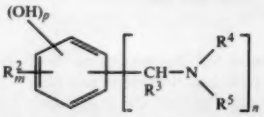


(I)

wherein the mixture has:
(a) a functionality of 2.1 to 3.2,
(b) an equivalent weight between 120 and 180, and
(c) a viscosity between 250 and 2500 centipoises, and
(d) n is from 0 to 8, and
B. a polyol having an equivalent weight between 30 and 60, and having Formula II:

$$HO—R^1—OH \quad (II)$$

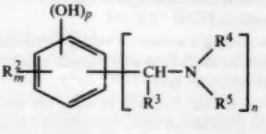
wherein R^1 is selected from the group consisting of lower alkylene and lower alkoxyalkylene, in the presence of
C. a tertiary amino phenol of Formula III:



(III)

wherein:
R^2 is alkyl, aryl, aralkyl, alkaryl, nitro, halogen, hydroxyl, hydrogen or hydroxyl alkyl,
R^3 is hydrogen or lower alkyl,
R^4 is alkyl, aryl, aralkyl or alkaryl,
R^5 is alkyl, aryl, aralkyl, or alkaryl,
n is an integer from 1 to 3 inclusive,
m is an integer from 1 to 4 inclusive,
p is 1 or 2,
with the proviso that
the sum of m, n and p is an integer from 1 to 6 inclusive,
D. a potassium salt of a saturated aliphatic monocarboxylic acid of 2 to 12 carbon atoms,
E. a blowing agent, and
F. a surfactant,
wherein:
the equivalent ratio of A:B is 2:1 to 6:1,
the equivalent ratio of D:A is .002:1 to .02:1,
the equivalent ratio of C:D is .6:1 to 2.5:1,
E comprises 5 to 20 weight % of the composition, and
F comprises 0.1 to 2 weight % of the composition,
and then
II. recovering the polyisocyanurate foam.

12. A catalytic composition consisting essentially of:
A. an alkali metal carboxylate which is a potassium salt of a saturated aliphatic monocarboxylic acid of 2 to 12 carbon atoms and
B. a tertiary amino phenol of Formula III:



(III)

wherein:
R^2 is alkyl, aryl, aralkyl, alkaryl, nitro, halogen, hydroxyl, hydrogen or hydroxyl alkyl,
R^3 is hydrogen or lower alkyl,
R^4 is alkyl, aryl, aralkyl or alkaryl,
R^5 is alkyl, aryl, aralkyl, or alkaryl,
n is an integer from 1 to 3 inclusive,

m is an integer from 1 to 4 inclusive,
p is 1 or 2,
with the proviso that
the sum of m, n and p is an integer from 1 to 6 inclusive, and the equivalent ratio of A:B is 1:0.6 to 1:2.5.

4,169,922

RIGID POLYURETHANE FOAM-FORMING COMPOSITIONS

Jasper H. Brown, East Alton; Albert W. Morgan, Collinsville, both of Ill., and Donald S. T. Wang, St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 27, 1977, Ser. No. 864,890
Int. Cl.[2] C08G *18/02*; C08J *3/18*
U.S. Cl. 521—155 **10 Claims**

1. Rigid polyurethane foam produced by subjecting to polyurethane foam-forming reaction conditions a composition comprising rigid polyurethane foam-forming reactants including an organic polyisocyanate and a polyol having more than two hydroxy radicals per molecule and, based on the weight of said polyol, from about 3% to about 10% alkyl aryl phthalate.

4,169,923

HIGH POLYMERS CONTAINING NICOTINIC ACID, PROCESS FOR THEIR PREPARATION AND THEIR USE

Paolo Ferruti, V.le Cassiodoro, 24, and Rodolfo Paoletti, V.le Regina Margherita, 43, both of Milan, Italy

Division of Ser. No. 622,442, Oct. 14, 1977, Pat. No. 4,067,876. This application Oct. 27, 1977, Ser. No. 846,129
Claims priority, application Italy, Oct. 15, 1974, 28420 A/74
Int. Cl.[2] C08F *8/30*
U.S. Cl. 525—279 **4 Claims**

1. Polymers having a molecular weight between 1,000 and 1,500,000 characterized in that they contain radicals of nicotinic acid bound to a polyamido-amino structue which comprises a copolymer of bis-acrylamides and hydroxyalkyl amines through covalent bonds that are generally hydrolyzed in biological environment by setting free nicotinic acid and nontoxic polymer residues, wherein the nicotinic acid radicals are bound to the macromolecular structure through the hydroxyalkyl chains of said hydroxyalkyl amines by means of ester bonds.

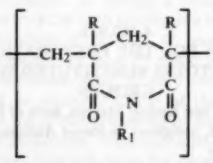
4,169,924

PREPARATION OF LINEAR CYCLIC POLYIMIDES FROM LATICES

Eugene S. Barabas, Watchung, and Andrew Klein, Somerville, both of N.J., assignors to GAF Corporation, New York, N.Y.

Filed Jun. 9, 1977, Ser. No. 805,001
Int. Cl.[2] C08F *8/32*
U.S. Cl. 525—377 **10 Claims**

1. A process for preparing a thermoplastic linear cyclic polyimide having a repeating unit



wherein R is hydrogen or lower alkyl and R_1 is hydrogen or an organic radical, which comprises adding to latex prepolymer having functional groups selected from the group consisting of carboxyl, amide, alkyl ester and nitrile a nitrogen-containing compound selected from the group consisting of ammonia, a primary amine and hydroxylamine or a mixture thereof, at a temperature of between about 50° C. and 300° C., with the proviso that nitrile functional groups in the latex prepolymer must be employed in a copolymer or terpolymer containing carboxyl groups.

4,169,925

MANUFACTURE OF OLEFIN POLYMERS

Wolfgang Gruber, Frankenthal; Hans Frielingsdorf, Bad Durkheim; Robert Bachl, Worms, and Guenther Schweier, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 28, 1978, Ser. No. 901,196
Claims priority, application Fed. Rep. of Germany, May 20, 1977, 2722955
Int. Cl.[2] C08F *4/26, 4/24, 10/00, 10/02*
U.S. Cl. 526—96 **5 Claims**

1. A process for the manufacture of an olefin polymer by polymerizing an α-monoolefin of 2 to 8 carbon atoms at from 60° to 160° C. and at an olefin pressure of from 0.5 to 40 bars by means of a catalyst which is obtained from a silicate carrier (component a), an aluminum compound (component b) and a chromium compound (component c), wherein the catalyst employed is obtained by

(1) initially

(1.1) charging a finely divided xerogel (component a) of the formula

$$SiO_2 \cdot mAl_2O_3$$

where m is a number from 0 to 2, this xerogel having a particle diameter of from 20 to 2,000 μm, a pore volume of from 0.7 to 2.6 cm^3/g and a surface area of from 150 to 600 m^2/g, with (1.2) a mixture of

(1.2.1) aluminum nitrate or a mixture of aluminum nitrate with up to 80 mole%, based on the mixture, of a nickel-II nitrate (component b) and

(1.2.2) a chromium compound (component c), which compound is chromium trioxide or a compound which is converted to chromium trioxide under the conditions of stage (2),

by thoroughly mixing with a solution of the mixture (1.2) and evaporating off the solvent and

(2) then maintaining the product obtained from stage (1) for from 10 to 400 minutes at from 600° to 1,000° C. in an anhydrous gas stream containing oxygen at a concentration of more than 10 percent by volume,

with the proviso that the catalyst contains from 0.1 to 10 parts by weight of component (b) (calculated as aluminum or aluminum plus nickel) and from 0.3 to 10 parts by weight of component (c) (calculated as chromium trioxide) per 100 parts by weight of component (a) (calculated as silica).

4,169,926

INORGANIC HYDROGELS AND USES THEREOF

Max P. McDaniel, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 16, 1978, Ser. No. 869,987
Int. Cl.[2] C08F *4/02, 4/78, 10/00*
U.S. Cl. 526—106 **38 Claims**

1. A method for drying an inorganic hydrogel comprising contacting said hydrogel with a contacting agent which comprises a normally liquid, oxygen-containing, water-miscible organic compound selected from the group consisting of polyhydric alcohols, the mono- and dialkyl ethers of alkylene glycols and poly(alkylene) glycols and mixtures thereof, for a length of time sufficient to obtain penetration of the contacting agent into the pores of the hydrogel and then applying sufficient heat to the treated hydrogel to remove the liquid components therefrom.

4,169,927

PROCESS FOR THE POLYMERIZATION OF ETHYLENE

Robert W. Hill, Houston; Thomas J. Lynch, Orange, and Peter M. Wisneski, Houston, all of Tex., assignors to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Oct. 13, 1977, Ser. No. 841,869
Int. Cl.[2] C08F *4/02, 10/02*
U.S. Cl. 526—124 4 Claims

1. A process for the polymerization of ethylene which consists essentially of contacting ethylene with a polymerization catalyst which is the reaction product of a vanadium ion-exchanged montmorillonite clay and an organometallic compound of a metal of Group II-A, II-B, or III-A of the Periodic Table; said vandium ion-exchanged montmorillonite clay having been prepared by treating a montmorillonite clay with an aqueous solution of vanadyl sulfate until said clay has incorporated therein, by ion-exchange, at least 3 weight % of vanadium (on a dry weight basis), washing said clay free of occluded ions, and drying said vanadium ion-exchanged clay.

4,169,928

ALKANOLAMINE SALTS OF DIHYDROXYSTEARIC ACID AS EMULSIFIER IN THE POLYMERIZATION OF VINYL CHLORIDE

Henri Sidi, Paramus, N.J., assignor to Tenneco Chemicals, Inc., Saddle Brook, N.J.

Filed Aug. 2, 1978, Ser. No. 930,479
Int. Cl.[2] C08F *2/24, 14/06*
U.S. Cl. 526—211 8 Claims

1. In the process for the polymerization of a monomer component selected from the group consisting of vinyl chloride and mixtures of vinyl chloride with at least one ethylenically-unsaturated monomer that is copolymerizable therewith, said mixtures containing at least 70% by weight of vinyl chloride, in an aqueous medium at a temperature in the range of 40° C. to 80° C. in the presence of a free radical generating polymerication initiator and an emulsifying agent, the improvement wherein the polymerization is carried out in the presence of from 0.10% to 3.0% by weight, based on the weight of the monomer component, of the emulsifying agent, said emulsifying agent being an alkanolamine salt of dihydroxystearic acid, the alkanolamine being selected alkanolamines having 2 to 10 carbon atoms.

4,169,929

MANUFACTURE OF LOW DENSITY ETHYLENE POLYMERS OF IMPROVED HOMOGENEITY

Oskar Buechner, Dudenhofen, and Volker Gierth, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed May 3, 1978, Ser. No. 902,285
Claims priority, application Fed. Rep. of Germany, May 16, 1977, 2722034
Int. Cl.[2] C08F *10/02, 110/02, 6/28*
U.S. Cl. 526—352.2 6 Claims

1. A process for the continuous manufacture of an ethylene polymer by homopolymerizing ethylene, or by copolymerizing ethylene with one or more compounds copolymerizable therewith, in a polymerization system (A) under a pressure of from 500 to 5,000 bars and at from 50° to 450° C. in the presence of a free radical polymerization initiator, and transferring the resulting reaction mixture into a high-pressure product isolation zone (B), which is under a pressure of from 100 to 500 bars and at from 150° to 400° C., thence through a throttling and control system (C) into a downstream low-pressure product isolation zone (D), which is under a pressure of from 1 to 10 bars and at from 150° to 400° C., and thence through a second throttling and control system (E) into a discharge extruder (F), the level of the molten ethylene polymer in (B) and (D) being set to a constant normal level by selection of the orifice cross-section of the system (C) or (E) downstream from (B) and (D) respectively, and/or the level in (D) being set to a constant normal level by selecting the speed of the screw of the extruder (F), wherein the level in (B) and (D) is periodically lowered relative to the normal level and again raised to the normal level, or is raised and then lowered, by periodically releasing and narrowing the orifice cross-section of the system (C) downstream from (B), or the level in (D) is similarly varied by periodically changing the orifice cross-section of system (E) or by periodically changing the speed of the screw of the extruder (F), the lowering and raising of the level in (B) and (D), or in (D), is in each case by from 50 to 100% of the normal level and the interval between the end of one lowering and raising, or raising and lowering, of the level (B) and (D), or in (D), and the start of the next change in level is at least about 30 minutes.

4,169,930

PROCESS FOR THE PRODUCTION OF AMINO SILICATE COMPOUNDS AND THEIR CONDENSATION PRODUCTS

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Division of Ser. No. 652,338, Jan. 26, 1976, Pat. No. 4,033,935, which is a continuation-in-part of Ser. No. 559,313, Mar. 17, 1975, Pat. No. 3,979,362, which is a continuation-in-part of Ser. No. 71,628, Sep. 11, 1970, abandoned. This application Apr. 8, 1977, Ser. No. 786,617
Int. Cl.[2] C08G *77/04*
U.S. Cl. 528—38 4 Claims

1. The process for the production of poly(aldehyde amino silicate) resinous products by the following steps:

(a) mixing about 10 parts by weight if silicic acid, weight calculated on the basic of dry silicic acid, and from about 5 to 20 parts by weight of an amino compound selected from the group consisting of urea, thiourea, melamine, aniline, dicyanidiamide, alkyl-substituted ureas and mixtures thereof;

(b) heating said mixture to a temperature of from about 70° C. to above the melting point, but below the boiling point of the amino compound, for at least 20 minutes; thereby

(c) producing an amino silicate compound;

(d) adding an aldehyde to the amino silicate compound in the ratio of 1 to 5 mols to each mol of the amino silicate compound;

(e) heating said mixture to a temperature of from about 70° C. to 150° C., while agitating for at least about 20 minutes, thereby

(f) producing a poly(aldehyde amino silicate) resinous product.

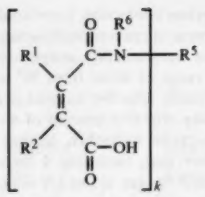
4,169,931

PROCESS FOR THE PREPARATION OF (THIO)HYDANTOINS SUBSTITUTED WITH AMIDE GROUPS

Ludwig Rottmaier, and Rudolf Merten, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 19, 1978, Ser. No. 897,683
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1977, 2718101
Int. Cl.[2] C08G *18/00*
U.S. Cl. 528—49 18 Claims

1. Processes for the preparation of amide-substituted (thio)-hydantoins which comprises reacting a primary mono- or poly-amine with a maleic acid amide corresponding to the following general formula (I):



(I)

wherein

R_1, R_2 and R_6, which may be the same or different, each represents hydrogen or an optionally substituted aliphatic radical;

R_5 represents hydrogen or an optionally substituted aliphatic, cycloaliphatic, aromatic, aliphatic-aromatic or heterocyclic radical; and

k represents an integer of from 1 to 3; reacting the resulting product with an organic mono- or poly-iso(thio)cyanate and subsequently cyclising the resulting product by the action of heat.

4,169,932

METHOD OF PRODUCING POLY-P-PHENYLENETEREPHTHALAMIDE OR ITS COPOLYMERS

Lev B. Sokolov, ulitsa Truda, 18, kv. 35; Valentin M. Savinov, ulitsa Ustina Labe, 20, kv. 20, and Vyacheslav S. Petrukhin, ulitsa Mira, 40, kv. 13, all of Vladimir, U.S.S.R.

Continuation of Ser. No. 708,347, Jul. 26, 1976, abandoned. This application Aug. 11, 1978, Ser. No. 933,103

Int. Cl.[2] **C08G** *69/28, 69/32*

U.S. Cl. 528—179 **4 Claims**

1. A process for producing a fiber forming poly-para-phenyleneterephthalamide or a copoly-para-phenyleneterephthalamide comprising the steps of:

(1) dissolving para-phenylenediamine or a mixture of 50 to 95 mol. percent of p-phenylenediamine with 50 to 5 mol. percent of an aromatic diamine of the diphenyl series selected from the group consisting of benzidine, 4,4′-diaminodiphenyl oxide, 4,4′-diaminodiphenyl sulfone, 4,4′-diaminobenzophenone, ortho-tolidine, ortho-dianisidine, in an amide-salt solvent in which the metal salt is used in an amount of between 1 and 3 mole per mole of the dissolved aromatic diamines and is selected from the group consisting of organic or inorganic alkali or alkaline earth metal salts soluble in the amide solvent and in which the amide solvent is selected from the group consisting of linear N-dialkyl-substituted carbamic acids, lower aliphatic acids and inner cyclic N-alkyl-substituted amides of aliphatic aminoacids, to obtain a solution thereof; (2) adding to said solution with stirring at a temperature in the range of from about 0° to +20° C. terephthalic acid dichloride or a mixture of 50 to 95 molar percent of terephthalic acid dichloride with 50 to 5 molar percent of a dichloride of an aromatic diacid of the diphenyl series selected from the group consisting of diphenyl-4,4′-dicarboxylic acid dichloride, diphenyloxide-4,4′-dicarboxylic acid dichloride, benzophenone-4,4′-dicarboxylic acid dichloride in which said aromatic diacid dichloride is employed in equimolar amounts with said aromatic diamine, to obtain a homogeneous reaction mixture; (3) adding to said reaction mixture, with stirring, a tertiary amine selected from the group consisting of α-picoline, β-picoline, N,N-dimethylbenzylamine, N,N-dimethylaniline, quinoline, pyridine, triethylamine, N-methylmorpholine, in an amount of from 2 to 6 moles per mole of the starting aromatic diamines; (4) stirring the resulting reaction mixture for a period of from 3 to 70 minutes to obtain poly-para-phenyleneterephthalamide, and (5) separating the resulting poly-para-phenyleneterephthalamide from the reaction mixture.

4,169,933

LIQUID CRYSTAL COPOLYESTERS CONTAINING TEREPHTHALIC ACID AND 2,6-NAPHTHALENEDICARBOXYLIC ACID

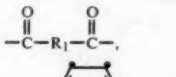
Winston J. Jackson, Jr., and John C. Morris, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 8, 1977, Ser. No. 822,989

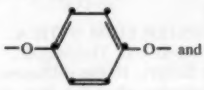
Int. Cl.[2] **C08G** *63/18, 63/66*

U.S. Cl. 528—190 **2 Claims**

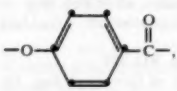
1. A copolyester having a fiber forming molecular weight consisting essentially of the following divalent radicals:



(A)



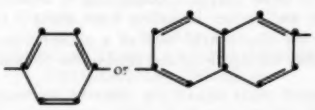
(B)



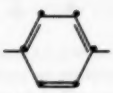
(C)

wherein

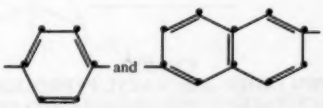
R_1 is



and the range of



is from 10 to about 60 mole percent, based on the total moles of



combined, and

the range of radical (C) is from about 8 to about 70 mole percent, based on the total moles of radical (A), radical (B) and radical (C) combined.

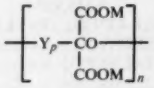
4,169,934

COPOLYMERS OF KETO DICARBOXYLATES

Victor D. Papanu, Maryland Heights, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 3, 1978, Ser. No. 892,591
Int. Cl.[2] C08G *2/20, 2/26*
U.S. Cl. 525—418 **32 Claims**

1. A copolymer having the following general formula:



where Y is one or more comonomers selected from the group consisting of olefins and aldehydes having 1 to about 3 carbon atoms; n averages at least 2; p is at least 1; and M is selected from the group consisting of alkali metal, ammonium, alkyl groups having 1 to about 4 carbon atoms, and alkanol amine groups having 1 to about 4 carbon atoms in the alkyl chain.

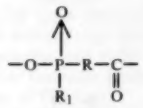
4,169,935

BIAXIALLY ORIENTED POLYESTER FILM WITH A FLAME-RETARDANT FINISH AND USE THEREOF

Klaus Hoheisel, Wiesbaden; Ulrich Bollert, Hofheim-Diedenbergen, and Siegfried Janocha, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 7, 1978, Ser. No. 913,339
Claims priority, application Fed. Rep. of Germany, Jun. 10, 1977, 2726189
Int. Cl.[2] C08G *63/68*
U.S. Cl. 528—287 **11 Claims**

1. A biaxially oriented polyester film, wherein the polyester comprises a linear polyester comprising a dicarboxylic acid and a diol, and further including from about 3 to 20 mole percent of the dicarboxylic acid of a phosphorus-containing chain member having structural units of the formula



wherein

R is a saturated, open-chain or cyclic alkylene radical, an arylene radical or an aralkylene radical, and

R_1 is an alkyl group containing up to 6 carbon atoms, an aryl or an aralkyl group.

4,169,936

CROWN ETHER AND N-ACYL PYRROLIDONE ACTIVATED COPOLYMERIZATION OF 2-PYRROLIDONE AND CAPROLACTAM

Robert Bacskai, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1978, Ser. No. 892,248
Int. Cl.[2] C08G *69/24*
U.S. Cl. 528—317 **18 Claims**

1. A process for copolymerizing 2-pyrrolidone with caprolactam to form a copolymer capable of being made into shaped articles which comprises contacting 2-pyrrolidone with about from 1 to 30 mol percent of epsilon-caprolactam, based on total 2-pyrrolidone, under substantially anhydrous conditions at temperatures in the range of about from 50° to 100° C. in the presence of a catalytically effective amount of an anionic catalyst and a catalytically effective amount of an N-acyl pyrrolidone and a crown cyclic polyether, having 12 through 30 atoms in its polyether ring, including 4 through 10 oxygen atoms and wherein said oxygen atoms are separated from each other by two or three carbon atoms, which is capable of forming a complex with said anionic catalyst.

4,169,937

METHOD FOR PREPARING A GRANULAR THERMOSETTING MOULDING COMPOSITION CONTAINING A NOVOLAK HAVING MODIFIED SURFACE CHARACTERISTICS

Silvio Vargiu, Casatenovo; Pier L. Manzoni, Codogno; Mario Bernasconi, Maleo, and Antonio Parodi, Monza, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Dec. 7, 1976, Ser. No. 748,359
Claims priority, application Italy, Dec. 19, 1975, 30492 A/75
Int. Cl.[2] C08G *8/10*
U.S. Cl. 525—493 **5 Claims**

1. A method for preparing a granular thermosetting molding composition including a novolak phenolic resin with modified surface characteristics, which comprises forming said molding composition into granules of from 2 to 8 mm in size and mixing said granules with an amount of from 0.5 to 3 wt.%, based on the weight of the granules, of one or more substances selected from the group consisting of acetone, phenol, aniline and reaction products of a styrene with phenol, wherein said reaction products are obtained by reacting phenol and styrene in the presence of an acid catalyst and have a density at 25° C. of from 1.080 to 1.087, a refractive index N_D^{25} of from 1.577 to 1.584 and a viscosity at 25° C. of from 50 to 62 cps, at a temperature such as to maintain said substances in liquid form and for a period such as to ensure absorption of said substances by said granules, whereby the surface of said granules is modified, without altering other characteristics of the granules, to render the granules free from a tendency to release dust during handling.

4,169,938

Patent Not Issued For This Number

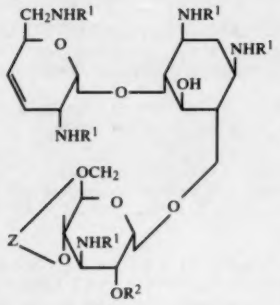
4,169,939

PROCESSES FOR THE PRODUCTION OF 3',4'-DIDEOXYKANAMYCIN B

Hamao Umezawa; Sumio Umezawa, both of Tokyo, and Tsutomu Tsuchiya, Yokohama, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

Filed Nov. 14, 1977, Ser. No. 851,019
Claims priority, application Japan, Dec. 16, 1976, 51-150334
Int. Cl.[2] C07H *15/22*
U.S. Cl. 536—10 **4 Claims**

1. A compound of the formula



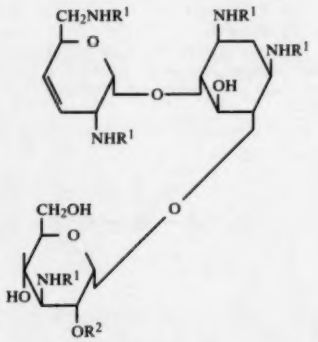
wherein

R^1 is benzyloxycarbonyl, p-chlorobenzyloxycarbonyl, p-aminobenzyloxycarbonyl, m-isopropylbenzyloxycarbonyl, p-isopropylbenzyloxycarbonyl, p-phenylbenzyloxycarbonyl, p-phenoxybenzyloxycarbonyl, α-naphthylmethyloxycarbonyl or β-naphthylmethyloxycarbonyl,

R^2 is lower alkyl-sulfonyl, arylsulfonyl selected from the group consisting of benzenesulfonyl, p-toluenesulfonyl, o-nitrobenzenesulfonyl, p-nitrobenzenesulfonyl, p-methoxybenzenesulfonyl, 1-naphthalenesulfonyl and 2-naphthalenesulfonyl or benzylsulfonyl, and

Z is lower alkylidene, arylidene formed from benzaldehyde, anisaldehyde or tolualdehyde, cyclohexylidene or tetrahydropyranylidene.

3. A compound of the formula



wherein

R^1 is benzyloxycarbonyl, p-chlorobenzyloxycarbonyl, p-aminobenzyloxycarbonyl, m-isopropylbenzyloxycarbonyl, p-isopropylbenzyloxycarbonyl, p-phenylbenzyloxycarbonyl, p-phenoxybenzyloxycarbonyl, α-naphthylmethyloxycarbonyl or β-naphthylmethyloxycarbonyl, and

R^2 is lower alkyl-sulfonyl, arylsulfonyl selected from the group consisting of benzenesulfonyl, p-toluenesulfonyl, o-nitrobenzenesulfonyl, p-nitrobenzenesulfonyl, p-methoxybenzenesulfonyl, 1-naphthalenesulfonyl and 2-naphthalenesulfonyl or benzylsulfonyl.

4,169,940

CHEMICAL OXIDATION OF NOVOBIOCIN AND PRODUCTS OBTAINED THEREFROM

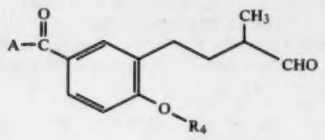
Lester A. Dolak, Cooper Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 793,822, May 5, 1977, abandoned. This application Feb. 15, 1978, Ser. No. 878,116

Int. Cl.[2] C07H *15/26*

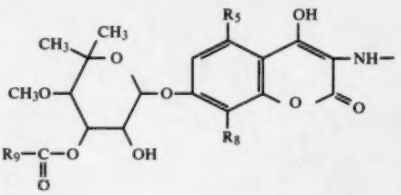
U.S. Cl. 536—13 **12 Claims**

1. An aledhyde novobiocin-type compound of the formula:



IIIa

or a pharmaceutically acceptable salt thereof where A is novenamine, where novenamine is



where R_5 and R_8 may be the same or different and are selected from the group consisting of hydrogen, alkyl of 1 thru 5 carbon atoms, halogen, nitro, cyano, carboxyl and $—NR_\alpha R_\beta$ where R_α and R_β may be the same or different and are hydrogen or alkyl of 1 thru 5 carbon atoms; R_9 is amino, 2-pyrryl, 2-(5-methylpyrryl), 2-furyl and 2-(5-methylfuryl); where is a single or double bond; and R_4 is hydrogen.

4,169,941

DERIVATIVES OF XK-88-5 AND PROCESS FOR THE PRODUCTION THEREOF

Hideo Matsushima, Machida, and Yasuki Mori, Kawasaki, both of Japan, assignors to Abbott Laboratories, North Chicago, Ill.

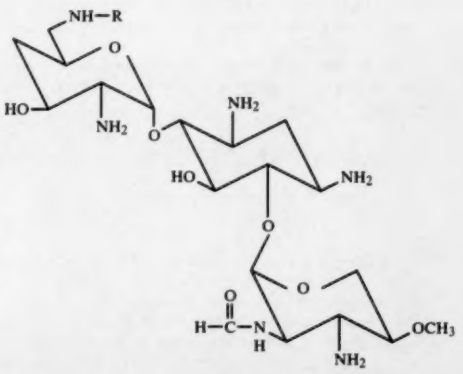
Filed Dec. 23, 1977, Ser. No. 863,629

Claims priority, application Japan, Dec. 25, 1976, 51-155656

Int. Cl.[2] C07H *15/22*

U.S. Cl. 536—17 R **1 Claim**

1. A process for producing a compound having the formula:



(wherein R is benzyloxycarbonyl or t-butyloxycarbonyl) which comprises reacting the compound XK-88-5 with from 0.1 to 10 mols per mole of XK-88-5 of an urethane-type amino-protecting reagent selected from the group consisting of benzyloxycarbonylchloride, N-benzyloxycarbonyloxysuccinimide, benzyl pentachlorophenylcarbonate, t-butyloxycarbonylazide and t-butyl S-4,6-dimethylprimidin-2-ylthiolcarbonate at a temperature of −20° to 50° C. for 0.5 to 48 hours.

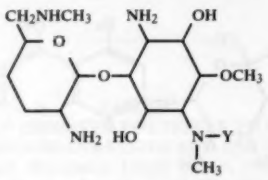
4,169,942

FORTIMICIN DERIVATIVES AND METHOD FOR PRODUCTION THEREOF

Kenichi Mochida, Hiratsuka, and Yasuki Mori, Kawasaki, both of Japan, assignors to Abbott Laboratories, North Chicago, Ill.

Filed Apr. 25, 1978, Ser. No. 899,725
Claims priority, application Japan, May 11, 1977, 52-53879
Int. Cl.[2] C07H *15/22*
U.S. Cl. 536—17 R **4 Claims**

1. A composition of matter represented by the formula



wherein Y is H or $COCH_2NH_2$.

4,169,943

PROCESS FOR THE PREPARATION OF AMINO DERIVATIVES OF N-HETEROCYCLES

Helmut Vorbrueggen, Berlin, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed May 12, 1977, Ser. No. 796,278
Claims priority, application Fed. Rep. of Germany, May 13, 1976, 2621645
Int. Cl.[2] C07H *19/06*
U.S. Cl. 536—23 **12 Claims**

1. A process for the conversion of the hydroxy group of a C-hydroxy-N-heterocyclic aromatic amine to an amino group, which comprises the steps of

(a) silylating, at 130°–230° C., with hexamethylcyclotrisilazane or octamethylcyclotrisilazane, a C-hydroxy-N-heterocyclic aromatic amine to produce a bisdimethylsilyloxy ester of the hydroxy group, which aromatic amine having 1–3 fused or separate rings; having as hetero ring members 1–4 amino nitrogen atoms and 0–1 O or S atom in the N-hetero ring, and having a hydroxy group on a ring carbon atom of an aromatic ring bearing an amino ring member, and

(b) reacting the thus-produced bisdimethylsilyloxy ester with ammonia or a primary or secondary amine of the formula

wherein R_1 and R_2 are the same or different and each is hydrogen or is alkyl of 1–6 carbon atoms, cycloalkyl of 5–6 carbon atoms, carbocyclic phenalkyl of 7–10 carbon atoms, phenyl or p-tolyl; or R_1 and R_2 collectively form an alkylene group of 2–6 carbon atoms, or a corresponding group in which one of the carbon atoms is replaced by an O or N atom, or one of the carbon atoms in the alkylene chain is substituted by methyl, halogen or phenyl.

4. The process of claim 1, wherein the C-hydroxy-N-heterocyclic amine is uridine.

4,169,944

CHOLESTEROL BIOSYNTHESIS INHIBITORS

Terence J. Scallen, and Cary J. Morrow, both of Albuquerque, N. Mex., assignors to University Patents, Inc., Norwalk, Conn.

Filed Sep. 19, 1977, Ser. No. 834,324
Int. Cl.[2] C07H *17/00*
U.S. Cl. 536—27 **3 Claims**

1. Fluorinated 3-hydroxy-3-methylglutaryl-coenzyme A, wherein the fluorine is attached to the 3-methyl radical.

4,169,945

PROCESS FOR PRODUCTION OF POLYGALACTOMANNAN ETHERS

Andrea A. DeGuia, North Plainfield; Robert W. Stackman, Morristown, and Anthony B. Conciatori, Chatham, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Jan. 5, 1978, Ser. No. 867,269
Int. Cl.[2] C08B *37/00*
U.S. Cl. 536—114 **7 Claims**

1. In a process for preparing alkyl ethers of polygalactomannan gum by the reaction of polygalactomannan gum with alkyl halide, the improvement which comprises reacting polygalactomannan gum with an alkyl halide in the presence of (1) at least a stoichiometric quantity of a strongly basic metal hydroxide, based on the weight of alkyl halide, and (2) between about 0.05 and 5 weight percent of a non-reactive water-soluble quaternary ammonium halide phase-transfer agent, based on the weight of polygalactomannan gum; in an aqueous reaction medium at a temperature between about 10° C. and 100° C. for a reaction period sufficient to achieve a degree of substitution by alkyl ether groups between about 0.01 and 3.0.

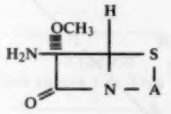
4,169,946

REACTIONS OF THIOOXIME CEPHALOSPORIN AND PENICILLIN DERIVATIVES

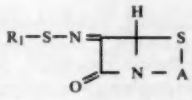
Eric M. Gordon, Pennington, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 748,425, Dec. 8, 1976, Pat. No. 4,109,084. This application Jun. 19, 1978, Ser. No. 917,000
Int. Cl.[2] C07D *501/18, 499/42*
U.S. Cl. 544—21 **25 Claims**

1. A process of preparing a compound of the formula

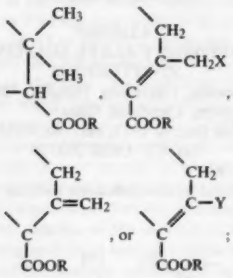


which comprises the step of reacting a thiooxime compound of the formula



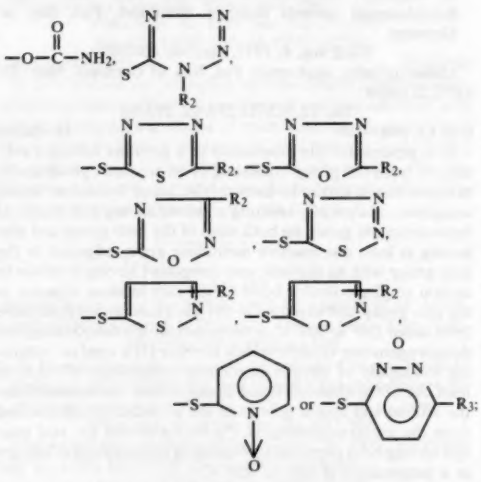
with a phosphine selected from the group consisting of tri(lower alkyl)phosphine, triphenylphosphine, and tri(substituted phenyl)phosphine, in an inert solvent with methanol and a metal catalyst selected from the group consisting of mercuric acetate, mercuric chloride, silver tetrafluoroborate, silver

acetate, silver nitrate, silver perchlorate, lead acetate, and thallium acetate, wherein A is



Y is halogen or lower alkoxy of 1 to 4 carbons; R is a readily cleavable ester group selected from the group consisting of t-butyl, benzyl, p-nitrobenzyl, p-methoxybenzyl, diphenylmethyl, tri(lower alkyl)silyl, lower alkoxymethyl, and 2,2,2-trichloroethyl; R_1 is lower alkyl, phenyl, or phenyl having a single substituent selected from the group consisting of halogen, lower alkyl of 1 to 4 carbons and lower alkoxy of 1 to 4 carbons; X is hydrogen,

lower alkyl,



R_2 is hydrogen or lower alkyl of 1 to 4 carbons; and R_3 is hydrogen, lower alkyl of 1 to 4 carbons, methoxy, hydroxy, or halogen.

4,169,947

7β-[[[2-ACYLAMINO]-1,2-DIOXOETHYL]AMINO]ACYL CEPHALOSPORINS

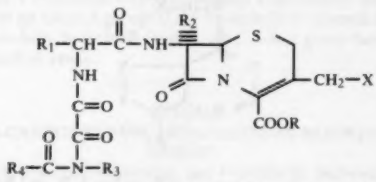
Uwe D. Treuner, and Hermann Breuer, both of Regensburg, Fed. Rep. of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed May 30, 1978, Ser. No. 910,548

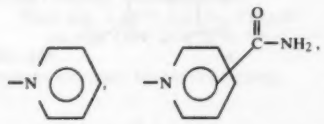
Int. Cl.[2] C07D *501/36, 501/34, 501/46, 501/22*

U.S. Cl. 544—27 **10 Claims**

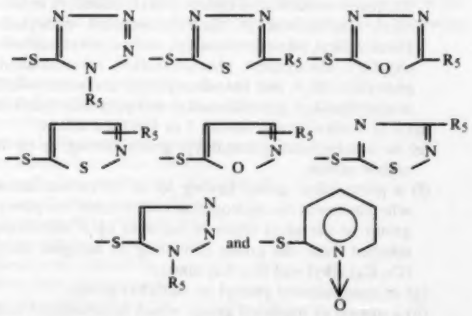
1. A compound of the formula



wherein R is hydrogen, lower alkyl, phenyl-lower alkyl, diphenyl-lower alkyl, tri(lower alkyl)silyl, trihaloethyl, aluminum, alkali metal, alkaline earth metal, phenyl-lower alkylamine, N,N-dibenzylethylenediamine, lower alkylamines, triethylamine, or N-lower alkylpiperidines; R_1 is hydrogen, lower alkyl, saturated or unsaturated cycloalkyl of up to 7 carbons, phenyl, phenyl-lower alkyl, substituted phenyl wherein said phenyl substituent is one or two members selected from the group consisting of halogen, lower alkyl, lower alkoxy, and hydroxy, or a heterocyclic selected from the group consisting of 2-thienyl, 3-thienyl, 2-furyl, 3-furyl, 2-pyridyl, 3-pyridyl, 4-pyridyl and 2-aminothiazolyl; R_2 is hydrogen or methoxy; R_3 is hydrogen, lower alkyl or phenyl-lower alkyl; R_4 is lower alkyl, cycloalkyl of up to 7 carbons, phenyl, substituted phenyl wherein the phenyl substituent is as defined above, or a heterocyclic selected from the group consisting of thienyl, furyl, pyridyl, thiazolyl and isothiazolyl; and X is hydrogen, lower alkanoyloxy,



carbamoyloxy, lower alkoxy, lower alkylthio, or a heterothio group selected from the group consisting of



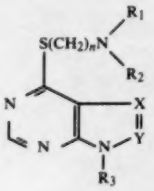
and R_5 is hydrogen or lower alkyl.

4,169,948
PYRAZOLOPYRIMIDINES

Joseph E. Dunbar, and Louis E. Begin, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 799,018, May 20, 1977, Pat. No. 4,139,705. This application Nov. 20, 1978, Ser. No. 962,526
Int. Cl.[2] C07D *487/04*
U.S. Cl. 544—118 4 Claims

1. A compound of the formula



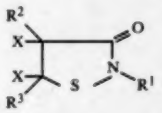
wherein n represents an integer of from 1 to 3; R_1 and R_2 taken together with the adjacent nitrogen represent the 6-membered heterocyclic ring morpholino; R_3 represents hydrogen, a lower alkyl having 1 or 2 carbon atoms, phenyl, or substituted phenyl having one or two halo substituents selected from the group consisting of chloro and bromo; and X represents a carbon atom with its respective hydrogen and Y represents nitrogen and the pharmaceutically-acceptable salts thereof.

4,169,949
ISOTHIAZOLIDIN-3-ONES

Ernest D. Weiler, Ambler, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 336,650, Feb. 28, 1973, abandoned. This application Jun. 9, 1977, Ser. No. 804,971
Int. Cl.[2] C61K *31/535;* C07D *275/02;* C11D *3/48*
U.S. Cl. 544—133 10 Claims

1. A compound of the formula



wherein

R^1 is

(a) a hydrogen atom;

(b) an unsubstituted alkyl group having 1 to 18 carbon atoms;

(c) a substituted alkyl group having up to 18 carbon atoms which is substituted with one substituent selected from the group consisting of hydroxyalkyl, haloalkyl, cyanoalkyl, alkylaminoalkyl, dialkylaminoalkyl, phenylalkylaminoalkyl, phenylaminoalkyl, carboxyalkyl, carbalkoxyalkyl, alkoxyalkyl, phenyloxyalkyl, alkylthioalkyl, phenylthioalkyl, and haloalkoxyalkyl, carbamoxyalkyl, morpholinalkyl, piperidinoalkyl and pyrrolidonylalkyl;

(d) a cycloalkyl group having 3 to 6 carbon atoms;

(e) an unsubstituted phenylalkyl group having up to 10 carbon atoms;

(f) a phenylalkyl group having up to 10 carbon atoms wherein one of the hydrogen atoms on either the phenyl group or the alkyl chain is replaced by a substituent selected from the group consisting of halogen, nitro, $(C_1–C_4)$ alkyl and $(C_1–C_4)$ alkoxy;

(g) an unsubstituted phenyl or naphthyl group;

(h) a phenyl or naphthyl group which is substituted with one substituent selected from the group consisting of halogen, cyano, nitro, $(C_1–C_4)$ alkyl, $(C_1–C_4)$ alkoxy, $(C_1–C_4)$ alkylphenylamino, $(C_1–C_4)$ carbalkoxy and sulfonyl; or

R^2 is a halogen atom or an unsubstituted $(C_1–C_4)$ alkyl group;

R^3 is a halogen atom or an unsubstituted $(C_1–C_4)$ alkyl group; and

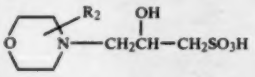
X is a halogen atom.

4,169,950
AMINO-HYDROXY-ALKYL SULFONIC ACID ZWITTERIONS

Wilfred J. Ferguson, University Heights, Ohio, assignor to Research Organics, Cleveland, Ohio

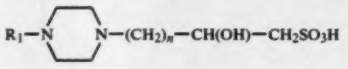
Filed Dec. 8, 1977, Ser. No. 858,616
Int. Cl.[2] C07D *295/10*
U.S. Cl. 544—158 7 Claims

1. A morpholinyl hydroxyalkalene sulfonic acid having the formula



wherein R_2 is a hydrogen atom, an alkyl or a hydroxyalkyl group containing up to about 5 carbon atoms in the alkyl group.

6. Amino sulfonic acid compounds having the general formula



wherein R_1 is a hydrogen atom, an alkyl or hydroxyalkyl group containing up to about five carbon atoms, or $—(CH_2)_n—CH(OH)—CH_2SO_3H$, and n is 1 or 2.

4,169,951
PROCESS FOR THE PRODUCTION OF SUBSTITUTED PYRIDINE (B)

Helmut Beschke, and Heinz Friedrich, both of Hanau, Fed. Rep. of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Fed. Rep. of Germany

Filed Sep. 6, 1977, Ser. No. 830,982
Claims priority, application Fed. Rep. of Germany, Mar. 23, 1977, 2712694
Int. Cl.[2] C07D *213/02, 213/08*
U.S. Cl. 546—250 18 Claims

1. A process for the production of a pyridine having a substituent from the group consisting of an aromatic group and a heteroaromatic group in each of the 2-and 3-position which comprises catalytically reacting a ketone having a aromatic or heteroaromatic group on both sides of the keto group and also having at least one reactive methylene group adjacent to the keto group with an aliphatic oxo compound having a carbon to carbon ethylenic double bond on the carbon atom adjacent to the oxo group and ammona in the gas phase at a temperature from about 250° to 500° C. in the presence of a dehydrating and dehydrogenating catalyst which is either (1) a catalyst consisting essentially of oxygen containing compounds of Al,F, at least one of the elements B and Si and at least one element from the second and fourth groups of the periodic system selected from the group consisting of Mg,Ba,Zn,Sn and Zr, said catalyst having been prepared by heating in the presence of oxygen at a temperature of 600° to 800° C.:

1. aluminum, aluminum oxide or an aluminum compound convertible to the oxide at said temperature,

2. a compound of fluorine, said fluorine having been added as ammonium fluoride, ammonium hydrogen fluoride,

hydrogen fluoride, fluoboric acid, fluosilicic acid, boron trifluoride, magnesium fluoborate, magnesium fluosilicate, zinc fluosilicate or barium fluosilicate,

3. boron, silicon, boric oxide, silica or a compound of boron or silicon convertible to the oxide at said temperature and
4. magnesium, zinc, tin, zirconium, magnesium oxide, zinc oxide, tin oxide or a compound of zirconium or barium convertible to the oxide at said temperature, the atomic ratio of Al to F being from 1000:25 to 1000:800 and the atomic ratio of Al to the total of (3) and (4) being from 1000:5 to 1000:200, the atomic ratio of the total of boron and silicon to the other element from the second and fourth group being between 1 to 10 and 10 to 1, (2) a catalyst having been prepared by heating at 600° to 800° C. in the presence of gaseous oxygen (1) aluminum metal, aluminum oxide or a compound of aluminum convertible to the oxide upon heating with gaseous oxygen at 600° C. to 800° C., (2) ammonium fluoride, hydrogen fluoride or a fluoride of an element of the second main group of the periodic system and (3) at least one element of the second main group of the periodic system, the oxide of said element or a compound of said element convertible to the oxide in the presence of gaseous oxygen at a temperature of 600° to 800° C., said catalyst consisting essentially of the elements Al, F, O and the element of the second main group of the periodic system being selected from the group consisting of Mg, Ca, Sr and Ba, and (3) a catalyst consisting essentially of the product obtained by treating with oxygen at a temperature of 550° to 1200° C., compounds of the elements Al, F and O and at least two other elements selected from the second, fourth, fifth and sixth groups of the periodic system, said two other elements being selected from the group consisting of Mg, Ba, Zr, Sn, Ti, P, Ta, Sb and S, the ratios of the elements being Al to F of between 1,000 to 10 and 1,000 to 800 and of Al to the elements of the second, fourth, fifth and sixth groups being between 1,000 to 5 and 1,000 to 200.

4,169,952
PROCESS FOR THE PREPARATION OF CYCLOHEXANONE-2-CARBOXAMIDE

Harold R. Drewes, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 14, 1977, Ser. No. 777,322
Int. Cl.[2] C07D *231/54;* C07C *102/00*
U.S. Cl. 548—359 **9 Claims**

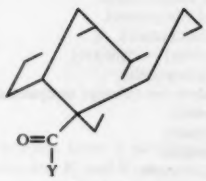
1. In a process for preparing cyclohexanone 2-carboxamide consisting essentially of (1) condensing one equivalent of urea with a stoichiometric excess of cyclohexanone at an elevated temperature to form a spirolactam, and then (2) hydrolyzing the spirolactam to cyclohexanone 2-carboxamide, the improvement wherein the pH during the hydrolysis of the spirolactam is maintained between 0.8 and 2.3.

4,169,953
TRICYCLO[4.3.1.1[2,5]]UNDECANE-1-CARBOXYLIC ACID AND DERIVATIVES THEREOF AND A PROCESS FOR PRODUCING THE SAME

Koji Aigami; Yoshiaki Inamoto; Motoyoshi Ohsugi; Yoshiaki Fujikura, all of Wakayama, and Naotake Takaishi, Sakura, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Jun. 20, 1978, Ser. No. 917,253
Claims priority, application Japan, Jun. 21, 1977, 52/72768; Jun. 21, 1977, 52/72769; Jul. 4, 1977, 52/79749
Int. Cl.[2] C07C *69/74;* A61K *31/215*
U.S. Cl. 560—117 **2 Claims**

1. Tricyclo[4.3.1.1[2,5]]undecane-1-carboxylic acid and acid halides and esters thereof represented by the formula (I),



(I)

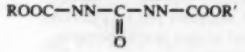
wherein Y represents a hydroxy group, a chlorine or bromine atom, or an alkoxyl group of the formula RO- wherein R is a straight-chain, branched-chain or cyclic alkyl group having 1 to 12 carbon atoms.

4,169,954
3,3-CARBONYLBIS(CARBAZATES) AS BLOWING AGENTS

Byron A. Hunter, Woodbridge, and Franklin H. Barrows, Beacon Falls, both of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Division of Ser. No. 782,673, Mar. 30, 1977, Pat. No. 4,105,601. This application May 22, 1978, Ser. No. 908,023
Int. Cl.[2] C08J *9/10*
U.S. Cl. 560—158 **4 Claims**

1. A carbonylbis(organo carbazate) blowing agent having the general formula



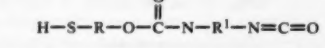
or dihydrate thereof wherein R and R^1 are the same and R and R^1 and are methyl isopropyl, secondary butyl or tertiary butyl.

4,169,955
MERCAPTOISOCYANATES AND PROCESS FOR PREPARING THE SAME

John A. Simms, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 1, 1977, Ser. No. 820,880
Int. Cl.[2] C07C *149/26, 69/34*
U.S. Cl. 560—159 **6 Claims**

1. A mercaptoisocyanate having the formula



wherein

R is an alkylene group having 2–6 carbon atoms and

R^1 is the residual from an organic diisocyanate, wherein the organic diisocyanate is selected from the group consisting of

isophorone diisocyanate,
propylene diisocyanate,
butylene diisocyanate,
methyl diisocyanato caproate,
hexamethylene diisocyanate,
trimethylhexamethylene diisocyanate,
octamethylene diisocyanate,
nonamethylene diisocyanate,
decamethylene diisocyanate,
diisocyano-dodecane,
phenylene diisocyanate,
toluene diisocyanate,
xylene diisocyanate,
dialkyl benzene diisocyanate,

biphenylene diisocyanate,
dimethyl biphenylene diisocyanate,
methylene-bis-(phenyl isocyanate),
ethylene-bis-(phenyl isocyanate),
isopropylidene-bis-(phenyl isocyanate),
butylene-bis-(phenyl isocyanate),
hexafluoroisopropylidene-bis-(phenyl isocyanate)
oxydiphenyl diisocyanate,
ketodiphenyl diisocyanate,
thiodiphenyl diisocyanate,
sulfone diphenyl diisocyanate,
methylene-bis-(cyclohexyl isocyanate),
propylene-bis-(cyclohexyl isocyanate),
bis-(para-isocyano-cyclohexyl)sulfide,
bis-(para-isocyano-cyclohexyl)sulfone,
bis-(para-isocyano-cyclohexyl)ether,
bis-(para-isocyano-cyclohexyl)diethyl silane,
bis-(para-isocyano-cyclohexyl)diphenyl silane,
bis-(para-isocyano-cyclohexyl)ethyl phosphine oxide,
bis-(para-isocyano-cyclohexyl)phenyl phosphine oxide,
bis-(para-isocyano-cyclohexyl)N-phenyl amine,
bis-(para-isocyano-cyclohexyl)N-methyl amine,
bis-(isocyano-phenyl)diethyl silane,
bis-(isocyano-phenyl)diphenyl silane,
dichloro-biphenylene diisocyanate,
bis-(isocyano-phenyl)ethyl phosphine oxide,
bis-(isocyano-phenyl)phenyl phosphine oxide,
bis-(isocyano-phenyl)-N-phenyl amine,
bis-(isocyano-phenyl)-N-methyl amine,
dimethyl diisocyano biphenyl,
dimethoxy biphenylene diisocyante,
bis-(isocyano butyl)toluene,
bis-(para-β-isocyano-t-butyl-phenyl)ether,
para-bis-(methyl isocyano phenyl)benzene,
para-bis-(dimethyl amino pentyl)benzene,
diisocyano adamantane,
diisocyano biadamantane,
diisocyanoethyl-biadamantane,
bis-(isocyano propoxy)ethane,
dimethyl propylene diisocyanate,
methoxy hexamethylene diisocyanate,
dimethyl heptamethylene diisocyanate,
methyl nonamethylene diisocyanate,
diisocyano cyclohexane,
diisocyano octadecane,
diisocyano oxadiazole,
$OCN(CH_2)_3O(CH_2)_2O(CH_2)_3NCO$,
$OCN(CH_2)_3S(CH_2)_3NCO$,

$OCN(CH_2)_3N(CH_3)(CH_2)_3NCO$ and mixtures thereof.

4,169,956

MANUFACTURE OF BUTANEDICARBOXYLIC ACID ESTERS

Rudolf Kummer, Frankenthal; Heinz-Walter Schneider, Ludwigshafen, and Franz-Josef Weiss, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 8, 1978, Ser. No. 940,463
Claims priority, application Fed. Rep. of Germany, Sep. 15, 1977, 2741511
Int. Cl.[2] C07C *67/38*
U.S. Cl. 560—204 **3 Claims**

1. In a process for the manufacture of butanedicarboxylic acid esters, by reacting butadiene or a hydrocarbon mixture containing butadiene with carbon monoxide and an alkanol of 1 to 4 carbon atoms in the presence of a tertiary nitrogen base and a cobalt carbonyl compound at from 80° to 150° C. under superatmospheric pressure and then, without removing the catalyst, reacting the pentenoic acid ester obtained further with carbon monoxide and an alkanol of 1 to 4 carbon atoms at from 140° to 200° C. under superatmospheric pressure, to give a butanedicarboxylic acid ester, wherein

(a) an aqueous cobalt salt solution is treated, at from 50° to 200° C. under pressures of from 50 to 500 bar, with excess carbon monoxide and hydrogen in the presence of active charcoal charged with cobalt carbonyl,

(b) the resulting aqueous solution of cobalt carbonyl hydride is extracted with butadiene or a hydrocarbon mixture containing butadiene and the aqueous phase is separated off,

(c) the butadiene, or butadiene-containing hydrocarbon mixture, which contains cobalt carbonyl hydride, cobalt carbonyl and butenyl-cobalt tricarbonyl is reacted with carbon monoxide and an excess of an alkanol of 1 to 4 carbon atoms in the presence of from 0.5 to 2 moles, per mole of butadiene, of a tertiary nitrogen base having a pK_a of from 3 to 11, at from 80° to 150° C., under a pressure of from 300 to 2,000 bar,

(d) the tertiary nitrogen bases contained in the reaction mixtures thus obtained are removed to the extent of leaving from 0.01 to 0.3 mole per mole of pentenoic acid ester produced, excess hydrocarbon is also removed, the pentenoic acid ester remaining in the reaction mixture is reacted with carbon monoxide and an excess of an alkanol of 1 to 4 carbon atoms at from 140° to 200° C. under a pressure of from 100 to 400 bar in the presence of the amount of cobalt carbonyl and tertiary nitrogen base remaining in the reaction mixture and thereafter the excess alkanol and free tertiary nitrogen base are distilled off, and

(e) the residual reaction mixture, containing cobalt catalyst, butanedicarboxylic acids and by-products, is treated with an oxidizing agent in an aqueous acid medium and the mixture is separated into an organic phase, from which butanedicarboxylic acid ester is isolated by distillation, and an aqueous phase containing cobalt salts, the improvement wherein the aqueous phase containing cobalt salts is extracted with a water-immiscible solvent.

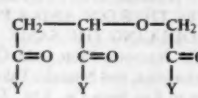
4,169,957

AMIDES OF CARBOXYMETHYLOXYSUCCINIC ACID

Vincent Lamberti, Upper Saddle River, and Eddie N. Gutierrez, Fort Lee, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 797,226, May 16, 1977, Pat. No. 4,093,634. This application Apr. 4, 1978, Ser. No. 893,228
Int. Cl.[2] C07C *103/32*
U.S. Cl. 562—564 **1 Claim**

1. A mixture of amido ether polycarboxyl compounds of the general formula:



wherein Y is independently NH_2,—NRR', or OM_1, and one or two Y substituents are NH_2 or —NRR', and at least one Y is always OM_1; wherein R is an alkyl group containing 6 to 22 carbon atoms or an alkylol group R_2OH wherein R_2 contains 2 to 4 carbon atoms and wherein R' is H or R as defined above and wherein M_1 is H an alkali metal or ammonium.

4,169,958

3-ALKOXY-4-HOMOISOTWISTANES

Yoshiaki Inamoto; Koji Aigami, both of Wakayama; Naotake Takaishi, Sakura, and Motoki Nakajima, Miyashiro, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

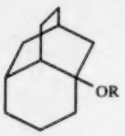
Filed Apr. 6, 1978, Ser. No. 893,828

Claims priority, application Japan, Apr. 11, 1977, 52/40339

Int. Cl.[2] C07C *43/00*

U.S. Cl. 568—665 2 Claims

1. A 3-alkoxy-4-homoisotwistane represented by the formula (I),



(I)

wherein R represents an alkyl group having 1 to 6 carbon atoms or a cycloaklyl group having 5 to 6 carbon atoms.

4,169,959

PROCESS FOR THE PREPARATION OF ETHYLENE GLYCOL-DIMETHYLETHER (DIMETHYL GLYCOL)

Hans-Jürgen Arpe, Kelkheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Apr. 13, 1978, Ser. No. 896,231

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1977, 2716690

Int. Cl.[2] C07C *41/00*

U.S. Cl. 568—672 3 Claims

1. In a process for the preparation of dimethyl glycol by the hydrogenolysis of methylglycol formal in the presence of a catalyst which comprises a mixture of silicon dioxide and aluminum oxide and/or an oxide of a rare earth, and in addition metallic nickel, cobalt, copper or a combination thereof, the improvement which comprises carrying out said hydrogenolysis in the presence of said catalyst additionally containing metallic palladium, rhodium, platinum or a combination thereof as promoters.

4,169,960

REMOVING WATER FROM FLUORINATED ALCOHOLS EMPLOYING A TETRAHYDROCARBYLAMMONIUM HYDROXIDE

William V. Childs, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 1, 1977, Ser. No. 856,549

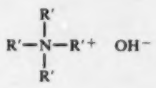
Int. Cl.[2] C07C *3/34*

U.S. Cl. 568—842 13 Claims

1. A process for removing water from a fluorinated alcohol containing water in an amount in the approximate range 0.5–25 wt % which comprises contacting the same intimately with an aqueous solution of a tetrahydrocarbylammonium hydroxide to substantially reduce the water in said fluorinated alcohol, and allowing formation of phases to occur and then separating the phases, wherein the alcohol is one represented by the formula

(I)

wherein R is selected from a perfluoroalkyl radical having 1–10 carbon atoms and R_1 and R_2 are selected from a hydrogen and a perfluoroalkyl radical having 1–10 carbon atoms and wherein the tetrahydrocarbylammonium hydroxide is represented by the formula



(II)

wherein R′ is selected from alkyl and cycloalkyl radicals having 1–6 carbon atoms.

4,169,961

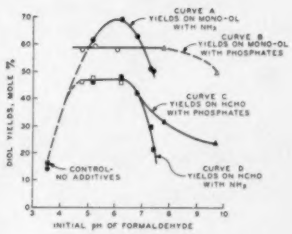
ALCOHOL PRODUCTION

Robert G. Wall, Pinole; John B. Wilkes, Richmond, and Shigeto Suzuki, San Francisco, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 665,749, Mar. 11, 1976, abandoned, which is a continuation of Ser. No. 427,176, Dec. 21, 1973, abandoned. This application Jul. 11, 1977, Ser. No. 814,586

Int. Cl.[2] C07C *31/20*

U.S. Cl. 568—857 9 Claims



1. A process for producing an alkenediol which comprises:

(a) feeding an alkenemono-ol to a reaction zone and therein contacting the alkenemono-ol with a formaldehyde feed in an aqueous medium; and

(b) maintaining the pH in the reaction zone above about 4 and below 6.5, the temperature between 300° and 600° F., and the pressure sufficient to maintain liquid phase, thereby reacting the alkenol with the formaldehyde to yield alkenediol.

4,169,962

HEAT TREATING APPARATUS

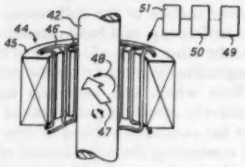
Susumu Hiratake, Kasugaishi, and Mitsuhiro Matsui, Nagoya, both of Japan, assignors to Daidoseiko Kabushikikaisha, Nagoya, Japan

Division of Ser. No. 619,087, Oct. 2, 1975. This application Jun. 6, 1977, Ser. No. 803,821

Claims priority, application Japan, Oct. 2, 1974, 49/114216; Oct. 12, 1974, 49/117265

Int. Cl.[2] H05H *1/02*

U.S. Cl. 13—2 P 9 Claims



1. A heat treating apparatus comprising:

(i) means for supporting material to be heat treated at a treatment region

(ii) a plasma torch positioned in spaced relationship with respect to said treatment region for producing and ejecting towards said treatment region a plasma for treatment of said material at said region

(iii) means for generating a rotating magnetic field acting between said plasma torch and said treatment region, the direction of the rotating magnetic field crossing the axis of said plasma, the direction of the magnetic field rotating unidirectionally about the axis of said plasma, whereby said plasma is caused by the rotation of said magnetic field to rotate between said plasma torch and said treatment region such that said plasma is in a state of rotation about its axis as it reaches said material to be treated.

4,169,963

ELECTRICALLY HEATED MELTING FURNACE FOR MINERAL MATERIALS

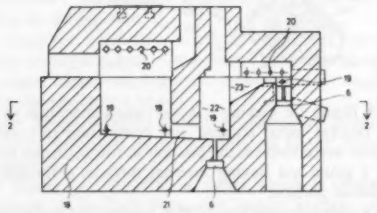
Helmut Pieper, Lohr, Fed. Rep. of Germany, assignor to Sorg GmbH & Co. KG, Pflochsbach bei Lohr a. Main, Fed. Rep. of Germany

Filed Apr. 24, 1978, Ser. No. 899,665

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1977, 2752467

Int. Cl.[2] C03B *5/02*

U.S. Cl. 13—6 6 Claims



1. An electrically heated melting furnace for the melting of mineral materials, such as frits, enamels and the like, comprising: a tank receptive a bath of molten material contained therein and including a lateral outlet, a riser connected thereto and a feeder following the riser and wherein the bottom of at least one of said riser and said feeder has a bottom outlet in communication therewith comprising a cylindrical element and a further underlying, concentrically disposed, circular disc-shaped element of a refractory material being conductive at high temperature and acting as an electrical conductor, which elements are conductively coupled to a current supply line; means for heating the material in the tank comprising electrodes contacting the molten material and having a current flowing therethrough which heats the molten material by Joule's heat; means for feeding a batch onto the molten bath; means for withdrawing the molten product from the bottom of the tank; wherein the tank has the cross-section of a substantially regular polygon and the depth of the tank corresponds approximately to the diameter of the tank; and a plurality of radiator heating rods arranged above the batch material and wherein said heating electrodes are positioned in the lower portion of the molten bath above the tank bottom.

4,169,964

ELECTRICAL SUPERCONDUCTOR

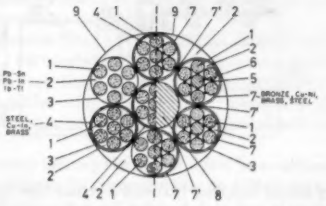
Imre Horvath, Rumlang; Kurt Kwasnitza, Glattbrugg, and Gundolf Meyer, Birmenstorf, all of Switzerland, assignors to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Filed Aug. 9, 1977, Ser. No. 823,185

Claims priority, application Switzerland, Aug. 31, 1976, 11015/76

Int. Cl.[2] H01B *12/00*

U.S. Cl. 174—15 S 19 Claims



1. In an electrical superconductor structure comprised in stepwise manner of single conductors and at least two stages of stranding of component cables, at least one of said single conductors and component cables being arranged within an included matrix material and interstitial layers of high resistance relative to the conductivity of the included matrix material arranged between at least one of the single conductors or the component cables, the improvement wherein the electrical resistances of the high-resistance interstitial layers from inner twisted single conductors to the interstitial layers of the outer component cables are progressively higher in at least two consecutive interstitial layers.

4,169,965

INTEGRALLY COOLED ELECTRICAL FEEDTHROUGH BUSHING

Edward F. Cronin, Lenox, Mass., assignor to General Electric Company

Filed Feb. 21, 1978, Ser. No. 879,052

Int. Cl.[2] H01B *17/26, 17/28;* H01F *27/12*

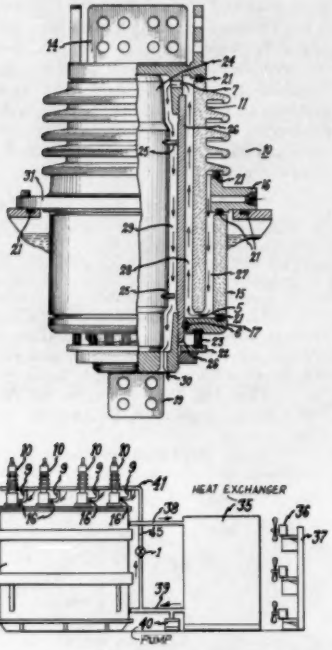
U.S. Cl. 174—15 BH 5 Claims

1. An electrical bushing cooling system in combination with an electrical apparatus of the type containing insulating fluid coolant and including a heat exchanger comprising in combination:

a plurality of integrally cooled electrical bushings connected with said electrical apparatus for providing electrical access to within said apparatus

fluid coolant displacement means contained within each

bushing for defining a fluid transfer path within each of said bushings; and



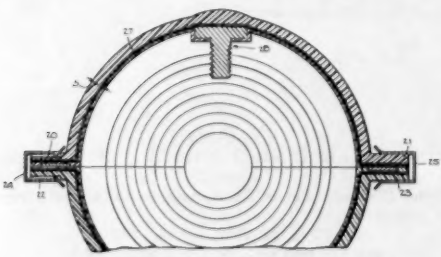
piping means coupling between a return line from the heat exchanger and each bushing for delivering fluid coolant from the heat exchanger to each bushing.

4,169,966

ELECTRICAL CABLE JOINT CASING

Carlo Casati, Arese, Italy, assignor to Servocavi Societa per Azioni, Novate Milanese, Italy

Filed Feb. 21, 1978, Ser. No. 879,142
Claims priority, application Italy, Feb. 22, 1977, 20517 A/77
Int. Cl.[2] H02G *15/18*
U.S. Cl. 174—92 **14 Claims**



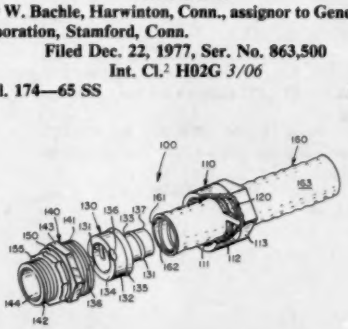
1. A cable joint between a pair of electric power cables, each of said cables having a conductor surrounded by insulation and a conductive shield around said insulation, the conductor of one said cables being conductively joined at its end to the end of the conductor of the other said cable within said joint and said insulation being removed from each conductor adjacent to the point of the conductive joining thereof, a casing around said joint with its inner surface spaced from each conductor, said casing comprising two similar half-casings which mate along a plane which extends longitudinally of and intersects said joint, each said half-casing being solid and continuous and being made of a transparent plastics material and being shaped to provide a casing with a larger central portion which tapers at its longitudinally opposite ends to smaller end portions having openings therein which, respectively, receive one of said cables around the portion thereof having said insulation, each said half casing having a band of good electrical conductivity material embedded therein immediately adjacent but spaced from the inner surface of the half-casing so that the inner surface of said band facing the cable conductors is covered by material of the half-casing and so that said band is nearer said inner surface of the half-casing than to the outer surface of the half-casing, said band extending from one longitudinal side to the other longitudinal side of the half-casing and extending longitudinally at least over the portions of the cable conductors from which said insulation has been removed, means conductively connecting one end of the band of each half-casing to the conductive shield of one said cable, means conductively connecting the opposite end of the band of each half-casing to the conductive shield of the other said cable, said means and said band interconnecting said shield of said one cable with the shield of the other said cable to provide electrical continuity therebetween, and a solid, cast insulating resin completely filling the interior spaces of said casing intermediate the inner surface thereof and said cables and engaging said inner surface, said resin without said casing providing the insulation required to insulate the conductor ends, said casing also being a protective covering for said insulation and said joint and said band being formed of conductive material with spaces therebetween to provide a multiplicity of openings therein distributed so that parts within the space within the casing can be visually observed through the transparent casing and said openings, prior to the installation of the insulating resin within the casing.

4,169,967

FITTING FOR LIQUID TIGHT FLEXIBLE METAL CONDUIT

Walter W. Bachle, Harwinton, Conn., assignor to General Signal Corporation, Stamford, Conn.

Filed Dec. 22, 1977, Ser. No. 863,500
Int. Cl.[2] H02G *3/06*
U.S. Cl. 174—65 SS **27 Claims**



1. A fitting for making a liquid tight connection to a liquid tight flexible metal conduit and comprising in combination elements assembled on the conduit in the sequence named:

(a) a gland nut having internal threads, a shoulder and a throat portion;

(b) a discontinuous sealing ring having first and second ends and first, second and third surfaces;

(c) a ferrule having a cylindrical wall encasing the end of a conduit inserted therein and with said cylindrical wall terminating in a flared portion the end of which contacts said first surface of said sealing ring for making a line sealing contact;

(d) a body member including threads mating with those of said gland nut and including a portion contacting said flared portion of said ferrule for making a line sealing contact therewith;

(e) said second surface of said sealing ring making line

contact with said shoulder portion of said gland nut in response to the engagement of the threads of said gland nut with the mating threads of said body member;

(f) said third surface of said sealing ring making sealing contact with the conduit in response to the engagement of the threads of said gland nut with the mating threads of said body member; and wherein

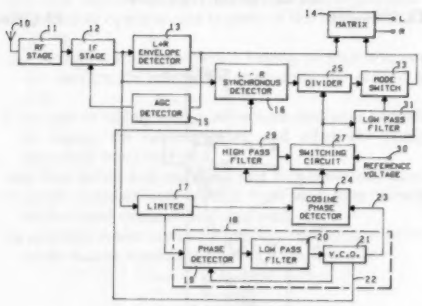
(g) the forces applied to said first and second surfaces by the contacting part of said ferrule and said shoulder, respectively, include components for urging the ends of said discontinuous sealing ring into sealing contact.

4,169,968

NOISE PROTECTION CIRCUIT FOR AM STEREO COSINE CORRECTION FACTOR

Norman W. Parker, Wheaton, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 27, 1978, Ser. No. 872,984
Int. Cl.[2] H04H *5/00*
U.S. Cl. 179—1 GS **10 Claims**



1. An AM receiver for receiving signals of the form $(L+R)\cos(\omega_c t+\phi)$ where L and R are information signals, $\omega_c t$ is the carrier frequency and ϕ is arc tan $\{(L-R)/(1+L+R)\}$ and comprising in combination:

input means for selectively receiving, amplifying and providing an output signal in response to the received signal;

demodulator means coupled to the input means for demodulating the responsive signal;

corrector means coupled to the demodulator means for providing an output signal proportional to the cosine of the angle ϕ;

circuit means for providing a signal which is related in amplitude to the high frequency energy content of the corrector means output signal;

a source of reference signal;

divider means coupled to receive an output signal from the demodulator means; and

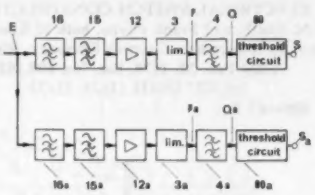
switching means coupled to receive the reference signal and the corrector means output signal and to selectively couple one of said signals to the divider means in response to the level of the output signal of the circuit means, the divider means dividing the output signal from the demodulator means by the selected signal from the switching means.

4,169,969

APPARATUS FOR DETECTING IN-BAND SIGNALLING SIGNALS

Jacques Bessard; Robert Dallemagne, and Claude Hannigsberg, all of Paris, France, assignors to Societe Lignes Telegraphiques et Telephoniques, Paris, France

Continuation of Ser. No. 628,844, Nov. 4, 1975, abandoned. This application Dec. 19, 1977, Ser. No. 862,160
Claims priority, application France, Nov. 21, 1974, 74 38236; Dec. 13, 1974, 74 41086
Int. Cl.[2] H04M *1/50*
U.S. Cl. 179—84 VF **3 Claims**



1. In a telephone system, a circuit for identification of pulsed signalling signals received at level n_L said signals at least consisting of a wave at a frequency f_1 within the speech frequency band modulated by means of recurrent pulses with a variable recurrence frequency comprising:

an input rejection filter with a maximum attenuation N set at f_1 and a 3 dB bandwidth at least equal to twenty times the maximum recurrence frequency of the signalling pulses;

a linear amplifier with a constant gain equal to G decibels having its input connected to the output of said rejection filter;

a limiter circuit limiting the output signal from said amplifier at an amplitude S_0 corresponding to a level n_0 equal to n_L-N+G;

a narrow band filter tuned at said frequency f_1 connected to the output of said limiter circuit; and

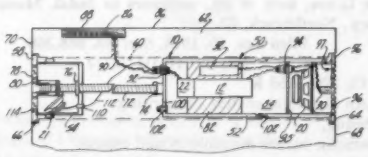
a threshold circuit connected to the output of said narrow band filter with a threshold value S'_0; such that $n_0-7.4$ dB$<S'_0<n_0$ for protection against speech signals.

4,169,970

MEMORIAL AUDIO REPRODUCTION SYSTEM

Michael L. Opiela, 5934 Appoline, Dearborn, Mich. 48126, and Stanley D. Zelazny, 7583 Driftwood Way, Pleasanton, Calif. 94566

Filed Feb. 13, 1978, Ser. No. 877,235
Int. Cl.[2] G11B *1/04*
U.S. Cl. 179—100.1 C **12 Claims**



1. An audio announcement system for a memorial monument comprising:

a housing,

means for mounting the housing within a memorial monument,

an audio recording medium having a prerecorded audio message contained thereon,

audio playback means contained within the housing for accepting said recording medium and, upon activation, playing said prerecorded message,

means for activating said playback means for a predetermined time period, and

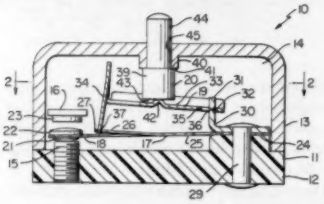
wherein said housing further comprises a first tubular part and a second tubular part in axial alignment, said housing parts adapted to be substantially wholly positioned in a thrcughbore in the memorial monument and wherein said mounting means comprises an enlarged diameter portion at one end of each housing part which abuts against the memorial monument, and means for locking the other ends of the housing parts coaxially together.

4,169,971

ELECTRICAL SWITCH CONSTRUCTION

William N. Smith, and Frank Payne, both of Knoxville, Tenn., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Feb. 22, 1978, Ser. No. 880,202
Int. Cl.[2] H01H *13/26, 13/52*
U.S. Cl. 200—67 B **7 Claims**



1. In an electrical switch construction comprising a housing means carrying a pair of spaced contact stops and a snap switch blade having a contact portion for being snapped between said stops when said blade is moved overcenter by an actuator spring member that is movable relative to said housing means by an actuator plunger, said actuator spring member having opposed ends respectively and operatively interconnected to said housing means and to said blade and being under tension between said ends thereof so as to have a resultant spring force normally tending to move said actuator member toward said plunger and thereby said blade toward one of said contact stops, the improvement wherein said actuator spring member comprises a one-piece substantially L-shaped leaf spring member separate from said blade and having two legs that respectively define said opposed ends thereof, one of said legs of said actuator spring member being pivotally mounted to said housing means to operatively interconnect said one leg to said housing means.

4,169,972

ELECTRICAL SWITCHES WITH ROCKER ACTION

Charles E. Black, III, Mt. Prospect, and Andrew F. Raab, Morton Grove, both of Ill., assignors to Indak Manufacturing Corp., Northbrook, Ill.

Filed Jan. 10, 1978, Ser. No. 868,268
Int. Cl.[2] H01H *23/14*
U.S. Cl. 200—153 K **4 Claims**

4. An electrical switch, comprising

a casing,

contactor means movable in said casing,

contact means in said casing and selectively engageable by said contactor means,

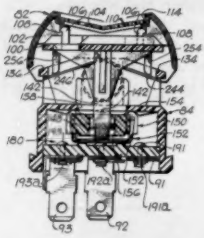
a rocker member rockably mounted on said casing and having means swingable with said rocker member for causing movement of said contactor means in response to rocking movement of said rocker member,

said casing having a front portion for supporting said rocker member,

pivot means rockably supporting said rocker member on said front portion of said casing,

a torsion return spring comprising a length of wire formed into a coil with opposite end arms extending from said coil,

said casing having a pocket formation for receiving said coil and slot formation for receiving said end arms with said spring prestressed,



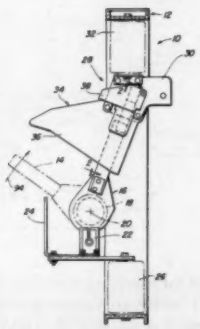
and a pair of spring-operating tabs on said rocker member for engaging and swinging said opposite end arms of said spring when said rocker member is swung in opposite directions from a central position.

4,169,973

BOUNCE-RESISTANT CONTACTS FOR A SWITCH

Joel A. Ramos, Chicago, and Roy T. Swanson, North Riverside, both of Ill., assignors to S & C Electric Company, Chicago, Ill.

Filed Oct. 30, 1978, Ser. No. 956,463
Int. Cl.[2] H01H *1/50, 3/60*
U.S. Cl. 200—256 **10 Claims**



1. An improved bounce-resistant contact assembly for use in a high-voltage switch; the switch including a blade movable into and out of engagement with the contact assembly; the assembly being of the type having (a) a pair of opposed, elongated contact plates with opposed contacts at their distal ends for receiving the blade therebetween, (b) leaf spring means for biasing the contacts together, (c) an equalizer for maintaining the leaf spring means under tension, and (d) spacer means for limiting the extent of movement of the contacts together; wherein the improvement comprises:

the contacts being spherical convexities formed in the plates; and which further comprises

a spherical concavity formed in each plate opposite from and concentric with its respective convexity, and

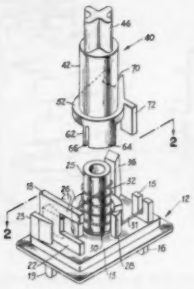
legs on the leaf spring means, an end of each leg acting against a respective concavity along the axis of the convexities and the concavities, each end having a rounded shape which nestles in and frictionally engages its respective concavity to maintain the legs in position along the axis and to damp oscillatory motion of the plates as the blade rapidly engages the contacts.

4,169,974

PUSH OPERATED MOMENTARY SWITCH

Charles A. Peers-Trevarton, Coral Springs, Fla., assignor to AMF Incorporated, White Plains, N.Y.

Filed Mar. 30, 1978, Ser. No. 891,785
Int. Cl.[2] H01H 1/06
U.S. Cl. 200—276 **15 Claims**



1. A momentary push operated switch comprising
a base member,
first and second stationary contacts disposed in spaced relationship on said base member,
a post extending upwardly from said base member,
a helical spring member disposed about said post with its helical axis substantially normal to said base member.
first and second spring ends extending tangentially from respective opposite end regions of the helical body of the spring,
said second stationary contact having at least one conductive surface for selectively contacting the second spring end,
a plunger in sliding engagement with said post and adapted to engage the second spring end when the plunger is depressed onto said post,
said first spring end engaging said first stationary contact,
a cover member cooperating with said base member to enclose said contacts and said post,
an aperture in said cover for guiding said plunger in a reciprocal motion toward and away from said post.

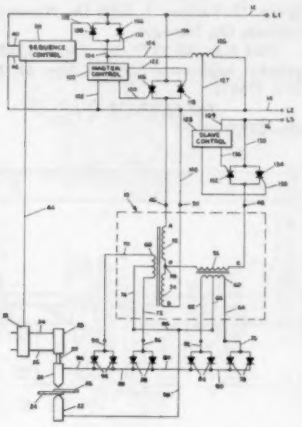
4,169,975

TWO-PHASE TRANSFORMER AND WELDING CIRCUIT THEREFOR

Merrill Block, 1736 Woodward, SE., Grand Rapids, Mich. 49506

Filed Jul. 8, 1977, Ser. No. 813,787
Int. Cl.[2] B23K 9/10
U.S. Cl. 219—116 **12 Claims**

1. In a welding apparatus having Scott-connected transformers, three primary input terminals which are adapted to be connected to a three-phase power supply and four secondary output leads which are connected to a first electrode through wafer diode assemblies, the transformer further having a center tap output lead from each of the secondary coils, which center tap output lead is connected to a second welding electrode, whereby a DC circuit is made through the first and second electrodes, the improvement comprising:
all of the four secondary output leads formed in a relatively flat configuration with top and bottom surfaces of greater extent than other surfaces of said leads, at least the top surfaces of each of said output leads lie entirely in a common plane;
deformable leads formed of multiple laminated straps of conductive material connected between each of the output leads and the diodes for firmly supporting the diodes;
a common conductor plate member of relatively flat configuration having a surface of greatest extent lying entirely in a plane parallel to the common plane of the output leads; and
means clamping the diode assemblies under pressure be-



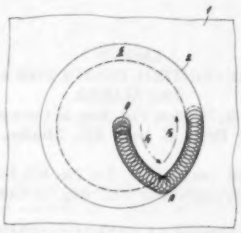
tween the common conductor plate and the deformable leads so that the leads deformably respond to any variation in thickness of the diodes as the diodes are secured in place so that equal pressure can be applied to each diode.

4,169,976

PROCESS FOR CUTTING OR SHAPING OF A SUBSTRATE BY LASER

Gian Franco Cirri, Florence, Italy, assignor to Valfivre S.p.A., Florence, Italy

Continuation-in-part of Ser. No. 772,470, Feb. 28, 1977, abandoned. This application Dec. 19, 1977, Ser. No. 861,707
Claims priority, application Italy, Feb. 27, 1976, 20681 A/76
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 LM **11 Claims**



1. A process for providing openings in, scoring of or shaping of a substrate of a ceramic material, or the like, by laser, comprising the steps of:
supplying a pulsed beam of laser light on the substrate portion to be drilled, scored or shaped, thereby producing a small size hole where each pulsed beam of light strikes the substrate; and
in synchronized relationship with the light beam pulses, relatively moving the laser beam and the substrate with respect to each other so that the light beam pulses follow a path corresponding to the shape of the opening that has been drilled, the scoring path that has been scored or the shaping to be made in the substrate.

4,169,977

APPARATUS FOR THE APPLICATION, POSITIONING AND ADJUSTMENT OF SECTIONS IN THE ASSEMBLY OF PANELS

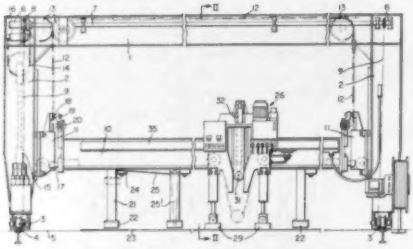
Einar Pedersen, O. Varåsen 7, 5200 Os, Norway, assignor to Einar Pedersen, Os, Norway

Filed Nov. 10, 1977, Ser. No. 850,265

Claims priority, application Norway, Nov. 11, 1976, 763844; Oct. 11, 1977, 773471

Int. Cl.[2] B23K *9/12*

U.S. Cl. 219—125.1 11 Claims



1. An apparatus for the application, positioning and adjustment of sections in the assembly of panels or the like, comprising a horizontally movable gantry adapted to transfer the sections from a store to that place on the panel plate to which the individual sections are to be welded, the gantry comprising a vertically movable yoke extending substantially parallel with the girder of the gantry, and having a number of gripper magnets for the sections, characterized in that the yoke is attached to the supporting uprights of the gantry with provision for vertical adjustment, said yoke having a jig displaceable along the yoke and comprising lifting means for retaining the panel plate and jack means for pressing the section against the panel plate.

4,169,978

TEMPERATURE CONTROL DEVICE FOR A COFFEE OR TEA MAKER

Reinhard Hauslein, Minden, Fed. Rep. of Germany, assignor to Melitta-Werke Bentz & Sohn KG, Minden, Fed. Rep. of Germany

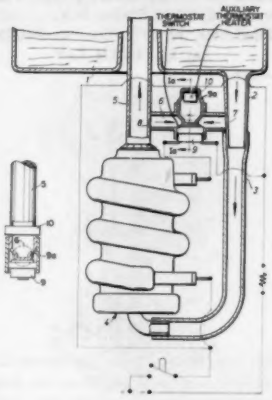
Filed Aug. 4, 1977, Ser. No. 821,960

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1976, 2635046

Int. Cl.[2] H05B *1/02;* A47J *31/56;* F24H *1/10*

U.S. Cl. 219—297 4 Claims

1. In a coffee or tea maker having a freshwater receptacle; a continuous flow heater including an electrically energized water heating means disposed below the receptacle and having an inlet and an outlet; a freshwater intake connecting the receptacle with the inlet of the continuous flow heater; a riser connected to the outlet of the continuous flow heater for guiding hot water exiting from the continuous flow heater; and a thermostat switch connected in the energizing circuit of the continuous flow heater for automatically energizing and de-energizing the water heating means of said continuous flow heater as a function of temperature; the improvement comprising conduit means defining a flow passage directly connecting said freshwater intake and said riser for receiving fresh water from said intake and heated water from said riser; said thermostat switch extending into said flow passage for responding to



the temperature changes of the mixture of fresh water and heated water in said passage.

4,169,979

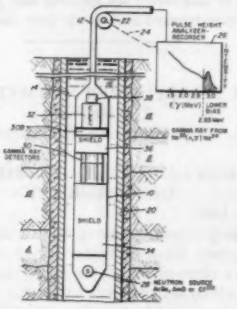
METHOD AND APPARATUS FOR MEASURING AZIMUTH AND SPEED OF HORIZONTAL FLUID FLOW BY A BOREHOLE

Dan M. Arnold; Obie M. Langford; Hans J. Paap, and Hubert D. Scott, all of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jul. 15, 1977, Ser. No. 815,964

Int. Cl.[2] G01V *5/00*

U.S. Cl. 250—266 30 Claims



1. Well logging apparatus comprising:

(a) an elongate sonde;

(b) a neutron source within said sonde;

(c) a gamma ray detection assembly within said sonde, including three gamma ray detectors displaced equidistant from said neutron source longitudinally along said sonde and disposed symmetrically about the longitudinal axis of said sonde; and

(d) an additional gamma ray detector within said sonde displaced longitudinally along said sonde from said three gamma ray detectors and said neutron source and disposed generally along a longitudinal axis of said sonde.

4,169,980

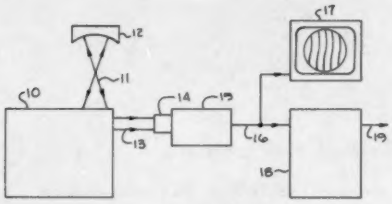
METHOD AND APPARATUS FOR INTERFERENCE FRINGE CENTER SENSING

Carl A. Zanoni, Middletown, Conn., assignor to Zygo Corporation, Middlefield, Conn.

Continuation-in-part of Ser. No. 788,736, Apr. 19, 1977, abandoned. This application Apr. 21, 1978, Ser. No. 898,832

Int. Cl.[2] G02B *27/38*

U.S. Cl. 250—550 **3 Claims**



1. An apparatus for rapidly locating the centers of fringes in an interference pattern comprises (1) means for providing a beam of light containing an interference pattern consisting of alternate bright and dark fringes, (2) means for scanning said interference pattern, (3) means for collecting and photosensing said beam of light, (4) means for processing the output of said photosensing means to obtain a signature indicating the centers of said fringes which comprises (5) means for differentiating the output of said photosensing means to obtain a first derivative signal which derivative is zero at the points at which the bright fringes are maxima and at which the dark fringes are minima, and (6) means for applying to said first derivative signal a threshold voltage adjustable to a preselected value, which is close to the maximum of said first derivative signal when bright fringes are being measured and to the minimum of said first derivative signal where dark fringes are being measured to produce a pulse whose width is equal to the time interval during which the first derivative signal is more positive than said positive threshold voltage in the case of bright fringes and more negative than said negative threshold voltage in the case of dark fringes, (7) means for delaying said pulse and (8) means for producing a signal indicating a fringe center only when said first derivative signal is zero and falls within said delayed pulse whereby spurious zeros due to noise are largely eliminated.

4,169,981

STRAND RESPONSIVE ELECTRICAL SWITCH

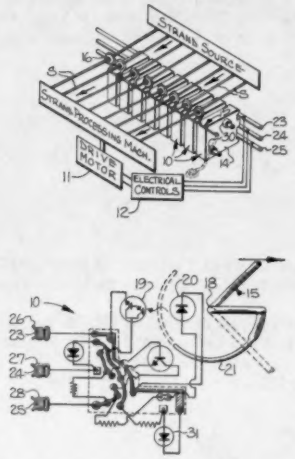
Eugene F. White, and Frances H. White, both of Rte. 4, Box 118, Monroe, N.C. 28110

Filed Jan. 31, 1977, Ser. No. 763,841

Int. Cl.[2] G01N *21/30*

U.S. Cl. 250—561 **10 Claims**

1. In combination with apparatus for advancing an individual tensioned textile strand along a predetermined path of travel, means for electrically signalling the occurrence of an improper operating condition of the advancing tensioned strand and comprising housing means defining a relatively thin and flat generally rectilinear package for mounting adjacent said path, guide means mounted from said housing means for engagement with said strand and for pivotal movement relative to said housing means about an axis extending transversely of said housing means in the direction of the thin dimension of said package and in response to said occurrence, light actuated electrical switching means within said housing means for electrically signalling the occurrence of a change in the illumination thereof, light source means within said housing means for illuminating said switching means, shutter means mounted within said housing means for movement in response to movement of said guide means and optically interposed between said switching means and said light source means for controlling the electrical signalling of said switching means in response to said occurrence, and means positioned on an edge of said



package for mounting said housing means in operative position.

4,169,982

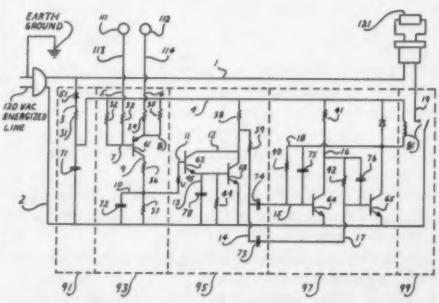
TOUCH-ACTUATED ELECTRONIC SWITCH

Albert D. Rittmann, 1111 Highland Dr., Kokomo, Ind. 46901

Filed Dec. 8, 1977, Ser. No. 858,535

Int. Cl.[2] H01H *35/00*; H03K *13/00*

U.S. Cl. 307—116 **2 Claims**



1. A touch-actuated electronic switch, comprising in combination: a direct current or voltage supply with output and common terminals; a voltage source alternating with respect to Earth ground; means for connecting said alternating voltage source to either the output or common terminal of the direct current or voltage supply such that the output terminal of the direct current or voltage supply has imposed on it all or part of the alternating voltage of said alternating voltage source; first signal input means; second signal input means; at least one touch surface; means for providing electrical connection between the touch surface and one of the input means; an amplifying device having at least three terminals, the relative voltage of the first terminal and the second terminal determining the voltage of or the current drawn by the third terminal; two or more resistors in series joining the first signal input means to a first voltage reference point, the common point of two of these resistors being connected to the first terminal of the amplifying device; two or more resistors in series joining a

second signal input means to a second voltage reference point, the common point of two of these resistors being connected to the second terminal of the amplifying device; and third circuit means for controlling the power to a load or performing some other useful function depending on the voltage of or the current drawn by the third terminal of the amplifying device.

4,169,983

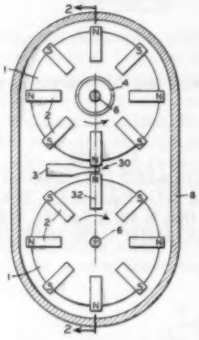
MULTI-ROTOR, DIRECT CURRENT ELECTRIC MOTOR

Donald W. Felder, 1153-A Drennan Park, Fort Campbell, Ky. 42223

Continuation-in-part of Ser. No. 725,628, Sep. 22, 1976, abandoned. This application Jun. 21, 1978, Ser. No. 917,547

Int. Cl.[2] H02K *37/00*

U.S. Cl. 310—46 **4 Claims**



1. A multi-rotor, direct current, electric motor comprising:

(a) a pair of proximal spaced rotors mounted for rotation about parallel rotary axes, the area between the closest spaced, opposed, circumferential surfaces of said rotors defining a center position containing a straight center line perpendicular to both rotary axes,

(b) a plurality of radially disposed permanent magnets uniformly circumferentially spaced around the perimeter of each of said rotors,

(c) said magnets on each rotor having outer poles of circumferentially alternating polarity,

(d) means confining said rotors to rotary movement in opposite directions from each other so that poles of like polarity on opposite rotors oppose each other in said center position,

(e) an electromagnet having a pole tip in said center position and intercepting said center line, and having magnetic shielding means projecting from said pole tip between the poles on opposite rotors trailing said center line,

(f) means responsive to the rotation of said rotors energizing said electromagnet to alternately reverse the polarity of said pole tip as each pair of opposed poles moves past said center position to change said pole tip from a polarity opposite the polarity of said opposed poles to the same polarity as said opposed poles, and

(g) said circumferential spacing between adjacent poles on each rotor being close enough that the pole next trailing said center line is attracted by said pole tip while the pole moving past said center line is repelled in the rotary direction of said respective rotor.

4,169,984

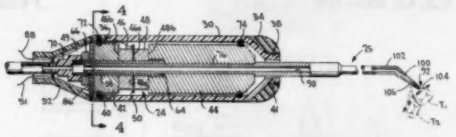
ULTRASONIC PROBE

Tulio Parisi, San Diego, Calif., assignor to Contract Systems Associates, Inc., San Diego, Calif.

Filed Nov. 30, 1976, Ser. No. 746,167

Int. Cl.[2] H01L *41/10;* **A61B** *17/32*

U.S. Cl. 310—323 **11 Claims**



1. Ultrasonic probe, comprising:

a housing;

piezoelectric transducer means located in said housing, said transducer means containing an axial bore;

an elongated operative tip extending through said axial bore of said transducer means and having a shoulder formed thereon at a longitudinal position spaced from said transducer means;

first and second body members arranged in axial alignment within said housing on opposite sides of said transducer means;

said first and second body members having respective axial bores in alignment with the axial bore of said transducer means;

a connecting rod extending through said axial bores of said second body member and said transducer means and extending partially through said axial bore of said first body member and interconnecting said body members;

means for adjusting the spacing between said first and second body members to prestress said transducer means by compressing said transducer means between said body members;

electrode means for applying an alternating electric voltage across said transducer means; and

securing means for releasably securing said tip to at least said first body member and said transducer means with said shoulder in abutment with said first body member;

said first body member being elongated and providing contact with said tip over a substantial portion of the length of said bore of said first body member.

4,169,985

GAS DISCHARGE DEVICE

Roger E. Ernsthausen, Luckey; Michael E. Fein, and Bernard W. Byrum, Jr., both of Toledo, all of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 204,818, Dec. 6, 1971, abandoned. This application Feb. 11, 1976, Ser. No. 657,135

Int. Cl.[2] H01J *61/35*

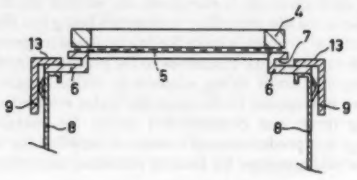
U.S. Cl. 313—218 **12 Claims**

1. An article of manufacture having a configuration for use in a gaseous discharge device and comprising a dielectric material body having surfaces facing in opposite directions, a plurality of spaced electrically conductive elements on one of said surfaces, and on the other of said surfaces a surface deposit containing a source of at least one element selected from the group consisting of phosphorus, arsenic, and antimony in an amount sufficient to provide uniform operating voltages and minimize aging cycle time, said source being an oxide of said element.

4,169,986
TELEVISION CAMERA TUBE HAVING RESILIENT GAUZE SUPPORTING STRUCTURE

Jan Stelwagen, and Alexius J. T. van Sambeeck, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 13, 1977, Ser. No. 815,265
Claims priority, application Netherlands, Aug. 16, 1976, 7609075
Int. Cl.[2] H01J *29/08, 31/38*
U.S. Cl. 313—383 **5 Claims**

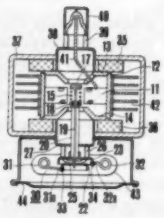


1. A television camera tube comprising a substantially cylindrical envelope, an electron gun in one end of said envelope, a face plate supporting a radiation-sensitive layer at the other end of said envelope facing the electron gun, a metal gauze supported by a tensioning ring, means for resiliently supporting said ring in said envelope between said radiation-sensitive layer and said gun, said supporting means including resilient elements secured to said ring and having portions extending generally perpendicular to the axis of said envelope to form with said ring and said gauze a mass spring system vibrating in the longitudinal direction of the envelope, the ratio of the mass of said system to the mass of the gauze exceeding 30, the fundamental frequency of the gauze and the natural frequency of the mass spring system differing less than 10% from each other and the damping of the mass spring system being so large that the time necessary for a 20 db amplitude decrease of the vibration of the mass of the mass spring system is smaller than 0.5 second.

4,169,987
MAGNETRON TUBES CATHODE SUPPORT

Tomokatsu Oguro; Yoshio Ishida; Mamoru Tsuzurahara, and Satoshi Kobayashi, all of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 3, 1978, Ser. No. 874,836
Claims priority, application Japan, Feb. 4, 1977, 52-11612
Int. Cl.[2] H01G *25/50*
U.S. Cl. 315—39.51 **5 Claims**

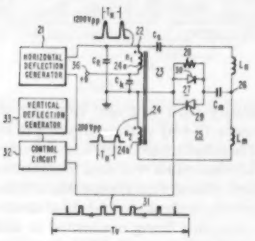


1. In a magnetron tube of the type comprising a cathode electrode, a stem structure for supporting the cathode electrode, an anode cylinder surrounding said cathode electrode, a plurality of vanes mounted on the inner side of said anode cylinder and disposed about said cathode electrode to define an interaction space therebetween, a pair of permanent magnets disposed on the opposite ends of said anode cylinder for creating a uniform magnetic field through said interaction space, and filter means mounted on the input side of said magnetron tube for preventing unwanted leakage radiation of high frequency wave, the improvement wherein said stem structure comprises two concentric supports each having one end respectively connected to the opposite ends of said cathode electrode, and two concentric cup shaped input terminals respectively connected to the other ends of said supports, lead wires extending from said filter means being welded to the edges of the openings of said cup shaped input terminals, and said lead wires being secured to said input terminals at portions near the welded ends by means of clamping members which clamp said lead wires and said edges of said input terminals.

4,169,988
RASTER DISTORTION CORRECTION CIRCUIT

Hans-Rudolf Fecht, Urdorf, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Apr. 20, 1978, Ser. No. 898,434
Claims priority, application United Kingdom, Jul. 25, 1977, 31162/77
Int. Cl.[2] H01J *29/56*
U.S. Cl. 315—371 **8 Claims**



1. A raster distortion correction circuit, comprising:
a deflection winding;
a deflection circuit coupled to said deflection winding for establishing first and second intervals within a deflection cycle;
a capacitance coupled to said deflection winding for forming a resonant circuit during said first interval;
an inductance coupled to said resonant circuit;
a controllable switch coupled to said inductance;
control means coupled to said controllable switch for providing control signals to said switch for changing the conductive states of said switch, said control means varying the duration of said first conductive state relative to said second conductive state within said first interval in a manner correcting for raster distortion; and
compensating means for coupling said inductance during said first interval in series with said deflection winding when said switch is in one of said first and second conductive states and for coupling said inductance during said first interval in parallel with said deflection winding when said switch is in the other of said first and second conductive states for adjusting the resonant frequency of said resonant circuit during said first interval for adjusting the duration of said first interval to a desired amount.

4,169,989
CIRCUIT ARRANGEMENTS FOR PROVIDING SAW-TOOTH CURRENTS IN COILS

Giuseppe Zappala, Turin, Italy, assignor to Indesit Industria Elettrodomestitici Italiana S.p.A., Turin, Italy

Filed Mar. 30, 1978, Ser. No. 891,520
Claims priority, application Italy, Apr. 6, 1977, 67758 A/77
Int. Cl.[2] H01J *29/70*
U.S. Cl. 315—408 **6 Claims**

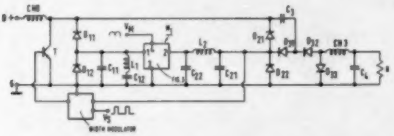
1. A circuit arrangement for providing a saw-tooth current in a deflection coil in which the amplitude of the current is

affected by a modulation signal, said saw-tooth current having a trace and a retrace interval, said arrangement comprising:

a first retrace capacitor and a first trace capacitor connected to said deflection coil to form a first oscillatory circuit;

a second retrace capacitor, a second trace capacitor and a first inductance coil connected together to form a second oscillatory circuit;

a controllable switch having a control electrode and first and second controlled electrodes; a second inductance coil; a power supply source; a periodic signal source; and first, second, third, and fourth diodes, said trace interval having first and second portions, wherein said first and second control electrodes of said controllable switch connects said second inductance coil to said power supply source when said controllable switch is actuated by said periodic signal source during said second part of said trace interval, said first and second diodes being connected in parallel with said first and second retrace capacitors respectively,



with polarity such that said first and second diodes are made conductive by current flowing in said deflection coil and said first inductance coil respectively, during said first part of said trace interval, said first retrace capacitor being connected to said first controlled electrode of said controllable switch through said third diode and said second retrace capacitor being connected to said first controlled electrode of said controllable switch through said fourth diode, said third diode being connected with polarity such that it is made conductive by current flowing in said deflection coil during said second part of said trace interval and said fourth diode being connected with polarity such that it is made conductive by current flowing in said first inductance coil during said second part of said trace interval; and

circuit means for controllably transferring energy from one of said first and second oscillatory circuits to the other thereof during said retrace interval.

4,169,990

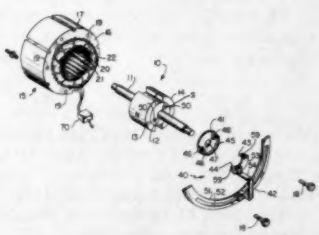
ELECTRONICALLY COMMUTATED MOTOR

David M. Lerdman, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Continuation-in-part of Ser. No. 729,761, Oct. 5, 1976, abandoned, which is a continuation-in-part of Ser. No. 482,409, Jun. 14, 1974, Pat. No. 4,005,347. This application Jun. 1, 1977, Ser. No. 802,484

Int. Cl.[2] H02K *29/00*

U.S. Cl. 318—138 **44 Claims**



1. A DC motor comprising a stationary armature having a core and at least two winding stages each comprising at least one effective winding; each winding comprising at least two coils of winding turns accommodated by the core and arranged to establish a predetermined number of magnetic poles, and the winding turns of each winding having a number of sets of axially extending conductor portions with such member being equal in number to the predetermined number of poles; the axially extending conductor portions within each given set being comprised generally of about one half of the conductor side turn portions of at least two different coils, and such conductors being disposed to conduct current instantaneously in the same axial direction along the core thereby contributing to the establishment of magnetic poles when the winding containing such given set is energized; the arcuate spread of any given set of axially extending conductors being less than about 120 electrical degrees; a rotor having constant magnetic polarity polar regions equal in number to the predetermined number of poles, said rotor being adapted to rotate relative to the armature in response to the magnetic poles established by the winding turns; and commutation means for energizing the windings in a predetermined manner to establish the magnetic poles on said armature for causing rotational movement of the rotor.

4,169,991

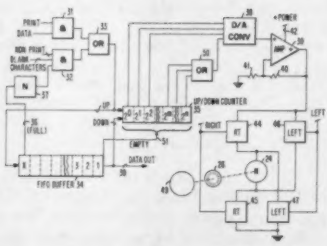
VARIABLE PRINT SPEED CONTROL

Charles O. Ross, Endicott, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 606,255, Aug. 20, 1975. This application Jul. 29, 1977, Ser. No. 820,482

Int. Cl.[2] G05B *11/28*

U.S. Cl. 318—599 **13 Claims**



1. A control system for moving a carrier having a print head thereon past successive character columns along a print line comprising:

lag counter means settable with a count representing the number of columns said carrier has yet to be moved along said print line;

velocity counter means and duty cycle counter means each settable with counts proportional to that in said lag counter means in response to changes in count in said lag counter means;

drive means operable in response to an energizing signal for moving said carrier and providing feedback signals to decrement said velocity counter means, each said feedback signal being representative of a predetermined fraction of a column moved by said carrier;

means for generating a succession of said energizing signals at a fixed frequency for said drive means, each said signal having a duration in proportion to the count in said duty cycle counter;

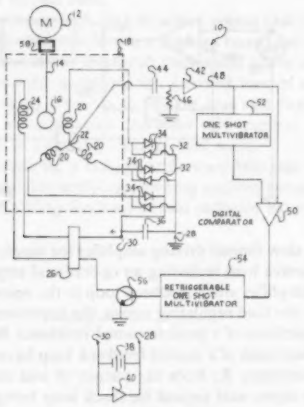
means including said velocity counter means responsive to said generating means for altering the count in said duty cycle counter means according to the count standing in said velocity counter means; and

column detection means responsive to said feedback signals for decrementing said lag counter means each time said carrier has traveled a distance of one column along said print line.

4,169,992
FEEDBACK SPEED CONTROL OF SPRING POWERED GENERATOR

Donald Nash, Santa Ana, Calif., assignor to Bible Translations on Tape, Inc., Cedar Hill, Tex.

Filed Nov. 23, 1977, Ser. No. 854,426
Int. Cl.[2] H02P *9/04*
U.S. Cl. 322—29 **5 Claims**



1. In the combination of an alternator having a rotor and a stator, mechanical means for rotating the rotor of said alternator so as to operate said alternator so as to provide an AC ripple output, said mechanical means being capable of delivering a variable amount of mechanical power to said rotor of said alternator during the operation of said alternator and load means for receiving the current produced by said alternator as it is operated, the improvement which comprises:

said alternator includes control winding means for use in creating a magnetic field controlling the magnetic coupling between said rotor and said stator;

feedback circuit means for controlling the speed of rotation of said rotor of said alternator so that said speed of rotation remains substantially constant as there is variation in the mechanical power delivered to said alternator by said mechanical means, said feedback means being connected to said alternator so as to receive an output from said alternator and being capable of detecting a variation in said output, said feedback means being capable of providing an electrical input to said alternator in accordance with the variation in the output from said alternator;

said circuit means including

means for receiving said output from said alternator and for converting said output from said alternator into a series of pulses corresponding to an AC ripple,

means for providing pulses of uniform duration, each of which corresponds to one of said pulses corresponding to said AC ripple,

means for comparing the duration of said pulses of uniform duration with said pulses corresponding to said AC ripple, and

means for releasing current to said control winding in accordance with any variation between the duration of the pulses of a uniform duration and said pulses corresponding to said AC ripple,

said means for releasing current serving to release a current to said control winding in a sufficient amount so that said control winding provides a magnetic field which holds the speed of rotation of said rotor substantially constant.

5. A process of controlling the speed of rotation of a rotor of an alternator providing an AC output as said alternator is being operated by said rotor being rotated by a mechanical means capable of delivering a variable amount of mechanical power to said rotor which includes the steps of:

monitoring the output of said alternator so as to detect any variation therein,

said monitoring including (a) converting said AC output into a series of pulses corresponding to an AC ripple, (b) creating a series of pulses of uniform duration, each of which corresponds to one of said pulses corresponding to said AC ripple, (c) comparing said pulses of uniform duration with said pulses corresponding to said AC ripple so as to obtain a signal indicating the difference between said pulses,

providing an electrical input to said alternator in accordance with any variation of said output of said alternator,

said input comprising an electric signal serving to create a magnetic field affecting the coupling between said rotor and said stator in said alternator,

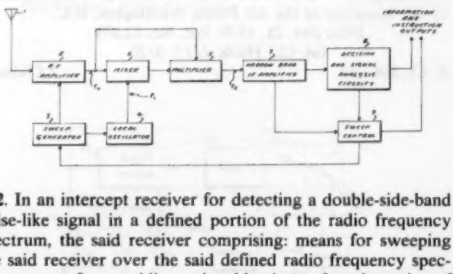
said step of providing an input including utilizing said signal corresponding to the difference between said pulses to provide a control signal controlling the release of a current through a control winding forming a part of said alternator producing a magnetic field as a result of said current release through said control winding, and

using said magnetic field so as to control the magnetic coupling between said motor and the remainder of said alternator so as to control the speed of rotation of said rotor.

4,169,993
INTERCEPT RECEIVER FOR DOUBLE-SIDE-BAND, NOISE-LIKE SIGNALS

Richard L. Taylor, Bladensburg, Md.; Ralph D. Drosd, deceased, late of Kensington, Md., and by Luther W. Gregory, administrator, Arnold, Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 4, 1967, Ser. No. 607,604
Int. Cl.[2] H04B *1/32*
U.S. Cl. 325—470 **2 Claims**



2. In an intercept receiver for detecting a double-side-band noise-like signal in a defined portion of the radio frequency spectrum, the said receiver comprising: means for sweeping the said receiver over the said defined radio frequency spectrum; means for providing a signal having a phase inversion of the said double side-band noise-like signal; means for multiplying the said signal having a phase inversion and the said double-like-band noise-like signal for providing an intermediate frequency signal; narrow band intermediate frequency amplifying means cooperating with the said multiplying means for providing a correlation output signal of the said double-side-band signal and phase inverted signal whereby the presence of a double-side-band noise-like signal is detected; and means cooperating with the said intermediate frequency amplifying means and the said sweeping means for stopping the sweep when a signal is detected.

4,169,994
CRYSTAL OSCILLATOR AND DIVIDER

Neal F. Nordling, White Bear Lake, Minn., assignor to Cardiac Pacemakers, Inc., St. Paul, Minn.

Filed Jan. 31, 1978, Ser. No. 873,899
Int. Cl.[2] H03K *21/36, 21/06, 21/10*
U.S. Cl. 328—41 **6 Claims**

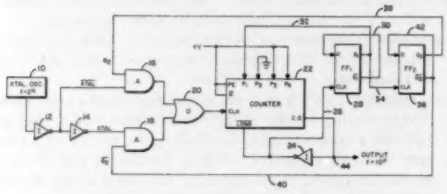
1. A frequency divider adapted to receive input signals of a

frequency, $f_1=2^N$, where N is a first predetermined integer and for producing at its output a signal of a frequency $f_2=10^P$ where P is a second predetermined integer, comprising:

(a) a source of regularly occurring electrical signals of said frequency, f_1;

(b) a programmable counter having data input terminals, a clock input terminal and a carry output terminal;

(c) a first control means having an input terminal coupled to said carry output terminal of said counter for alternately



causing a first and a second binary number value to be entered into said counter via said data input terminals each time a carry output signal is produced at the carry output terminal of said counter; and

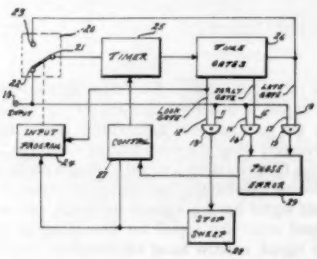
(d) a second control means responsive to the output from said first control means for selectively applying said regularly occurring electrical signals of frequency, f_1, or the complement thereof to said clock input terminal of said counter, the arrangement being such that said carry output signal is of a frequency approximately equal to f_2.

4,169,995

PULSE REPETITION FREQUENCY TRACKER

Carl D. Wise, and Richard J. Wiegand, both of Severna Park, Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 21, 1970, Ser. No. 12,879
Int. Cl.[2] H03K *1/17, 5/20*
U.S. Cl. 328—63 **7 Claims**



1. A pulse repetition frequency tracker apparatus comprising in combination:

an input terminal,

a timer means, said timer means comprising a timer unit and a time gates unit, said timer unit providing timing signals to said time gates unit, said timer unit receiving an input pulse train from said input terminal and locking onto said pulse train; and

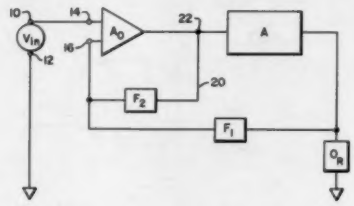
a control means connected to receive said input pulse train from said input terminal comprising a phase error discriminator unit connected to said timer gates unit for phasing sensing and correcting said timing signals of said timer unit to zero phase error, and a search look gate unit for acquiring the proper frequency and phase of said input pulse train.

4,169,996

OPERATIONAL AMPLIFIER WITH SLEW RECOVERY ENHANCEMENT

George A. Cavigelli, Lexington, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed May 24, 1978, Ser. No. 909,095
Int. Cl.[2] H03F *1/36*
U.S. Cl. 330—99 **3 Claims**



1. In a slew limited driving amplifier for supplying a substantially reactive load including an operational amplifier for said driving amplifier and a feedback loop to the operational amplifier from the load regulating means, the improvement comprising the addition of a predetermined resistance R_1 in said loop and the inclusion of a second feedback loop having a predetermined resistance R_2 from the output of said amplifier to its feedback input, said second feedback loop being substantially in parallel with said driving amplifier resistance R_1 and wherein the resistances R_1 and R_2 have the relationship such that the quantity

$$\frac{V_o\left(\frac{R1}{R1+R2}\right)}{\text{SLOPE}} \geqq \text{DELAY}$$

wherein

SLOPE = the slope of the load current curve of the amplifier at overload,

R_1 and R_2 are feedback resistances in ohms, and

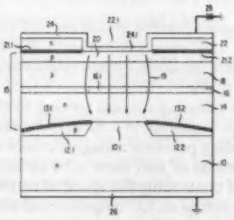
V_o is the output voltage to the amplifier in volts is equal to or greater than a predetermined time, expressed in microseconds, which represents the inertial delay of the loaded current source.

4,169,997

LATERAL CURRENT CONFINEMENT IN JUNCTION LASERS

Ralph A. Logan, Morristown, and Won-Tien Tsang, Summit, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 6, 1977, Ser. No. 794,466
Int. Cl.[2] H01S *3/19*
U.S. Cl. 331—94.5 H **9 Claims**



1. A stripe geometry junction laser comprising:

a semiconductor body of one conductivity type having a stripe mesa formed on a major surface thereof;

a pair of separate layers of the opposite conductivity type formed on said major surface on opposite sides of said mesa and contiguous with the side walls thereof;

a laser structure formed on said layers and the top of said mesa so as to form at the interface with said layers a first pair of laterally spaced, blocking p-n junctions which are separated by said mesa,

said laser structure including an active region and a first p-n junction therein which, when forward biased and pumped with current above threshold, causes said active region to emit stimulated radiation, the forward bias of said first junction being effective to reverse bias said first pair of blocking junctions and constrain said current to flow essentially in a channel through said mesa;

means for receiving a voltage to forward bias said first p-n junction and for applying pumping current thereto; and

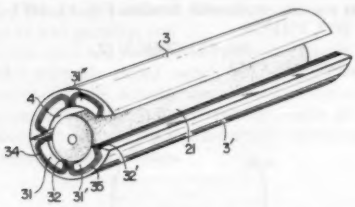
means for providing feedback of said radiation to said action region.

4,169,998

IRON CORE ASSEMBLY FOR MAGNETIZING COLUMNAR PERMANENT MAGNETS FOR USE IN ELECTROSTATIC DEVELOPING APPARATUS

Hideki Harada, Urawa; Keitaro Yamashita, Kamisatomachi, and Katsunobu Yamamoto, Kumagaya, all of Japan, assignors to Hitachi Metals, Ltd., Japan

Filed Oct. 3, 1977, Ser. No. 838,870
Int. Cl.[2] H01F *13/00*
U.S. Cl. 335—284 **4 Claims**



1. An iron core assembly for magnetizing a columnar permanent magnet for use in an electrostatic developing apparatus comprising:

a plurality of axially extending and circumferentially spaced magnetizable projections defining, at their radially inner ends, a throughbore for receiving a columnar permanent magnet to be magnetized, said inner ends being located in close proximity to the outer cylindrical surface of said columnar permanent magnet received by said throughbore,

coil windings for magnetizing said magnetizable projections so as to provide circumferentially alternate magnetic poles, said coil windings being wound around said magnetizable projections and received by grooves formed between adjacent magnetizable projections, and

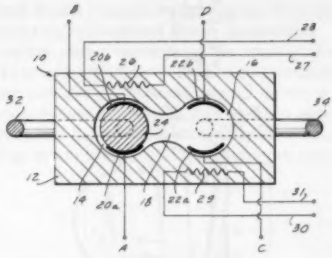
wherein the circumferential width of said magnetizable projections is relatively large with respect to that of said grooves so as to constitute means for imparting abrupt polarity inversions to the columnar permanent magnet along the circumference of the latter.

4,169,999

THERMAL-MAGNETIC SWITCH

Joseph F. Kishel, Clarks Summit, Pa., assignor to Sangamo Weston, Inc., Norcross, Ga.

Filed Nov. 1, 1977, Ser. No. 847,513
Int. Cl.[2] H01H *37/02*
U.S. Cl. 337—2 **12 Claims**



1. A switch comprising:

a housing defining a cavity having first and second regions communicating with one another;

a pair of spaced contacts positioned in said first region;

means for communicating electrically with said contacts;

an electrically conductive fusible element disposed within said cavity and bridging said contacts when said fusible element is disposed within said first region, said fusible element being in a solid phase at normal operating temperatures of said switch;

means for melting said fusible element; and

magnet means for setting up a magnetic field in said first region, said field having a component to generate a Lorentz force, when current flows in said fusible element disposed in said first region, urging said fusible element toward said second region.

4,170,000

METHOD AND APPARATUS FOR FUSING ELECTRICAL POWER EQUIPMENT ENCLOSED IN A TANK AND SURROUNDED BY INSULATING FLUID

Frank C. Trayer, 25690 LaLanne Ct., Los Altos Hills, Calif. 94022

Filed May 27, 1976, Ser. No. 690,424
Int. Cl.[2] H01H *85/02*
U.S. Cl. 337—204 **10 Claims**

1. An enclosure for electrical power equipment, comprising:

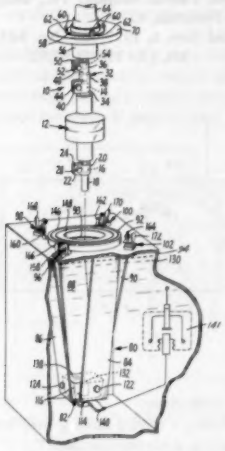
a tank capable of containing electrical power equipment and a body of insulating fluid surrounding and contacting it, and having an opening through one of its walls large enough to admit a fuse, and a cover for said opening;

an insulating bushing passing through and sealed to said cover;

connector means for making connection with one ferrule of said fuse;

means for affixing said fuse to said insulating bushing and connecting a ferrule of said fuse to a conductor which passes through said insulating busing; and

suspender means for so suspending said connector means in said tank that said body of insulating fluid will surround



and contact said fuse when one of its ferrules is connected to said connector means.

4,170,001

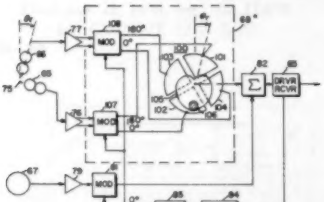
CAPACITOR GONIOMETER TILT COMPENSATION FOR ACOUSTIC TRANSDUCING SYSTEM

Robert L. Townsend, Amherst, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Aug. 3, 1978, Ser. No. 930,825

Int. Cl.[2] G01S *3/80*

U.S. Cl. 367—120 **4 Claims**



1. An acoustic transducer system comprising first and second bi-directional electro-acoustic transducers each having a maximum response axis, means for mounting said transducers with said maximum response axes perpendicular to each other and to a predetermined axis about which they may rotate, and a compensator including a vertical reference device for measuring the deflection angle between the vertical and a reference direction fixed with respect to said transducers and also including means for modifying the outputs of said transducers by functions of said deflection angle and for combining such modified outputs so as to obtain an output signal corresponding to a predetermined response pattern which does not vary substantially with rotation of said transducers about said axis, said predetermined axis being substantially horizontal and said compensator comprising a capacitive goniometer having a plurality of plates fixedly mounted with respect to said transducers and having a single plate parallel to said plurality of plates and rotatable about an axis parallel to said predetermined horizontal axis, and a weight mounted on said single plate for maintaining said single plate in the same angular orientation despite rotation of said plurality of plates.

4,170,002

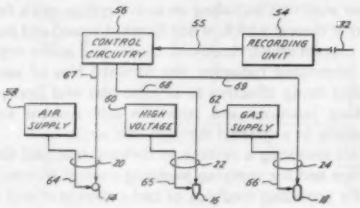
SEISMIC SYSTEM USING A COMBINATION OF GENERICALLY DIFFERENT SOURCES

Booth B. Strange, Houston, Tex., assignor to Western Geophysical Co. of America, Houston, Tex.

Continuation-in-part of Ser. No. 734,919, Oct. 22, 1976, abandoned. This application Jul. 12, 1978, Ser. No. 923,850

Int. Cl.[2] G01V *1/04, 1/38*

U.S. Cl. 367—23 **4 Claims**



1. A seismic exploration system comprising:

a plurality of generically-different spaced-apart seismic acoustic sources;

means for actuating said seismic sources so that the signals from the respective seismic sources blend into a single composite seismic wave;

means for detecting said composite seismic wave; and

means for producing a single seismic recording from said detected composite seismic wave.

4,170,003

DEVICE FOR EXAMINATION OF DISTANCES IN A PICTURE

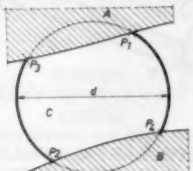
Per-Erik Danielsson, Hedborns gata 30, S-582 49 Linköping; Carl A. B. Kruse, Kindlyckevägen 9, S. 590 41 Rimforsa, and Michael A. X. Palmbo, Björnkärrsgatan 7B:12, S-582 48 Linkoping, all of Sweden

Filed Feb. 13, 1978, Ser. No. 874,646

Claims priority, application Sweden, Feb. 11, 1977, 7701565; Dec. 2, 1977, 7713716

Int. Cl.[2] G06K *9/12*

U.S. Cl. 340—146.3 MA **14 Claims**



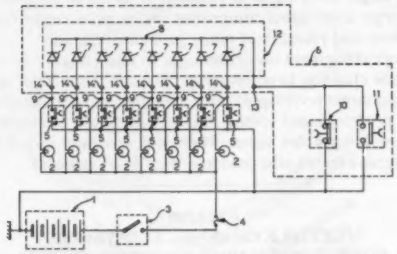
1. A device for examination of distances between spaced apart objects in a two-dimensional quantized picture, of which the individual picture elements are assigned the values 0 and 1 and objects consist of contiguous elements having the same value; characterized by at least one logical unit **(1)** which for each individual picture element senses the values of the peripheral picture elements (x_i) of a subpicture of defined geometric form associated with the individual picture element, where this subpicture is of a size related to the smallest allowable distance between two objects; further characterized by the logical unit's **(1)** including logical elements **(2–12)** which by means of the sensed values determine whether, on a closed loop formed by the subpicture's peripheral elements (x_i), there are at least two transitions from a picture element with value 0 to an element with value 1, and with the logical unit **(1)** giving a warning signal only if at least two such transitions appear.

4,170,004

DEVICE FOR MONITORING THE SERVICEABILITY OF OPTICAL INDICATORS

Santino Portinaro, Caluso, Italy, assignor to Fiat-Allis Macchine Movimento Terra S.p.A., Lecce, Italy

Filed Mar. 23, 1978, Ser. No. 889,388
Claims priority, application Italy, Apr. 8, 1977, 67779 A/77
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—514 **5 Claims**



1. In an electrical control system for a machine having an electrical circuit including a battery, a normally open switch which is closed to initiate machine operation and coupled in series with the battery, a series connected normally closed switch which is opened upon initiation of machine operation, a plurality of warning lamps coupled in parallel with the battery and each of which is operably connected to a sensor for generating a control signal effective to illuminate one of said warning lamps for displaying a visual indicator signal, and a testing system for displaying the operability of each of the warning lamps during machine operation, the improvement comprising

a plurality of diodes each one of said plurality mutually exclusively electrically coupled in series to one of said plurality of warning lamps and to one terminal of a plurality of normally open function control switches actuable to a closed current-coupling position in response to a control signal from said sensor to illuminate said one warning lamp of said plurality, and

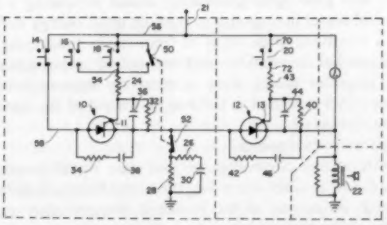
a normally open test switch electrically coupled in parallel to said normally closed switch and in series with said plurality of diodes, actuable into a closed current-coupling position to simultaneously electrically couple all of said diodes to the battery for simultaneously illuminating said plurality of warning lamps.

4,170,005

SWITCH OPERATED ALARM CIRCUIT

Norman G. Duke, 53 Tordale Crescent, Scarborough, Ontario, Canada (M1P 3X6)

Filed Dec. 19, 1977, Ser. No. 861,724
Int. Cl.[2] G08B *13/08, 29/00*
U.S. Cl. 340—547 **9 Claims**



1. In an alarm circuit

a sentinel device adapted to provide stand-by voltage to operate an alarm;

said sentinel device being normally inoperative when an operating voltage is applied thereto;

enabling means including a plurality of switches operable by the application of an energy field to render said sentinel device operative whereby to provide stand-by voltage for an alarm;

first switch means operable by application of an energy field for rendering said sentinel device inoperative;

second switch means operable on the opening of a door or the like to cause stand-by voltage of said sentinel device to operate said alarm when said sentinel device is rendered operative by said switches of said enabling means;

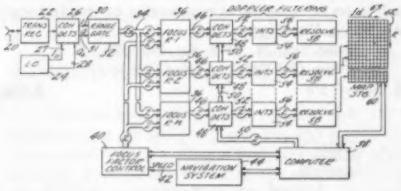
said first switch means and said plurality of switches of said enabling means being in close proximity to each other.

4,170,006

RADAR SPEED MEASUREMENT FROM RANGE DETERMINED BY FOCUS

Thomas Falk, Norwalk, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 30, 1971, Ser. No. 175,890
Int. Cl.[2] G01S *9/46*
U.S. Cl. 343—5 CM **2 Claims**



1. In the method of determining speed in a forward-looking, coherent pulse doppler synthetic aperture signal processing mapping radar apparatus, the steps of:

(a) providing a forward-looking, coherent pulse doppler synthetic aperture signal processing mapping radar apparatus having range gating means for sorting return signals in accordance with range from which said signals are reflected, and in which the return signals are applied to respective range channels, each of said range channels including parabolic focusing in response to focus term signals applied thereto, doppler filtering and storage, each of said channels thereby capable of providing a plurality of successive signals representative of the magnitude of the return signal at each of a plurality of different successive doppler frequencies, the successive signals for all of said range channels comprising a range/doppler matrix of magnitude of reflectivity;

(b) providing focus term signals relating to a nominal speed and an arbitrary selected one of said range channels and processing signals in said apparatus therewith;

(c) determining the values of contrast of signals for each range channels of said range/doppler matrix;

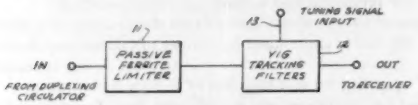
(d) determining a range for which contrast will be maximum;

(e) calculating speed as the square root of the sum of: the square of the range rate with the product of range acceleration times the range selected in step (d).

4,170,007
ADDING FREQUENCY AGILITY TO FIRE-CONTROL RADARS

Harry Goldie, Randallstown, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 20, 1978, Ser. No. 871,067
Int. Cl.[2] G01S 9/02
U.S. Cl. 343—5 R **1 Claim**



1. A system to provide frequency agility to fire control radars having a duplexing circulator providing an output signal connection, a missile guidance rf frequency signal, and a receiver having an input connection, the said system comprising:

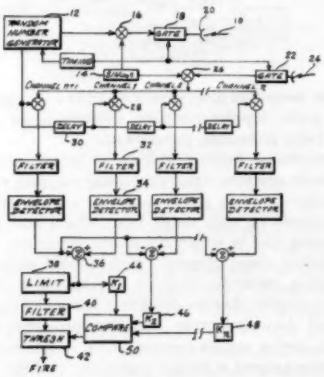
a. a passive ferrite frequency-selection YIG limiter connected to the said output of the duplexing circulator and providing an output signal; and

b. a YIG rejection tracking filter having an input connection connected to the said output of the passive ferrite limiter, a tuning control input signal connection connected to the said missile guidance rf frequency signal for synchronously tuning the said tracking filter to the said missile guidance rf frequency, and an output signal connection connected to the said receiver input connection.

4,170,008
CLUTTER DISCRIMINATING FUZE APPARATUS

Robert H. Goebel, Bridgeton, and Dale A. Fogle, St. Louis Township, St. Louis County, both of Mo., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 28, 1975, Ser. No. 553,360
Int. Cl.[2] F42C 13/04; G01S 9/37
U.S. Cl. 343—7 PF **5 Claims**



1. A clutter discriminating fuze apparatus for discriminating against both active and passive electronic countermeasures comprising in combination:

control means for providing a control signal,

means for generating and transmitting connected to said control means to receive said control signal, said generating and transmitting means providing a bi-phase coded signal in response to said control signal, said bi-phase coded signal being gated,

means for receiving said bi-phase coded signal, said receiving means being connected to said control means to receive said control signal, said receiving means and said generating and transmitting means being gated mutually exclusive,

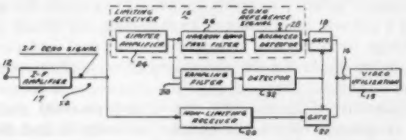
a plurality of range gate channels respectively connected to said receiving means to receive said bi-phase coded signal, each of said plurality of range gate channels being respectively centered on a different predetermined doppler frequency, said plurality of range gate channels respectively detecting a return within its predetermined doppler frequency, said plurality of range gate channels providing a target level signal in response to detected returns, said target level signal comprising one or more target returns from said plurality of range gate channels, and

a logical compare unit connected to said plurality of range gate channels to receive said channels target level signal, said target level signal being weighted and compared with a predetermined level standard, said logical compare unit providing a fire signal when said weighted target level signal exceeds said predetermined level standard.

4,170,009
MULTIPLE CHANNEL ELECTRONIC COUNTERMEASURES RECEIVER SYSTEM

Edward G. Hamer, North Linthicum, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 3, 1963, Ser. No. 327,848
Int. Cl.[2] G01S 7/36; H04B 1/10
U.S. Cl. 343—18 E **2 Claims**



1. A multiple channel electronic countermeasures radar receiving system comprising:

an input to which periodic echo pulses beat to the intermediate frequency of the system and combined with random noise energy is applied;

limiting receiver means including in the order recited a limiter amplifier coupled to said input and having a pass band centered on the intermediate frequency, a narrow band-pass filter fed by the amplifier and having a center frequency the same as the intermediate frequency, and a balanced detector fed by the filter for converting phase changes of the intermediate frequency echo pulses to video amplitude changes;

a nonlimiting receiver coupled to said input and having limiting characteristics linear for small signals and logarithmic for large signals,

gate signal-generating means tuned to a frequency within the pass band of the amplifier but removed from the intermediate frequency for receiving output signals of the amplifier, said gate signal-generating means producing a gate control signal in response to random noise energy defined by a relatively wide band of frequencies bracketing the pass band of the amplifier and attenuating output signals of the amplifier which have a relatively narrow band of frequencies confined to the neighborhood of the intermediate frequency,

a video utilization means,

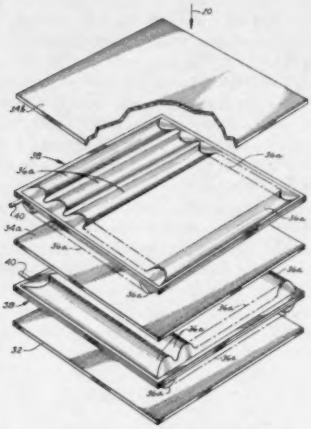
and gate means controlled by said gate signal-generating means for, at times when the gate control signal is derived, gating the output of the balanced detector only to the video utilization means and at other times coupling only the output of the nonlimiting receiver to the video utilization means.

4,170,010

INFLATABLE RADIATION ATTENUATOR

Robert G. Reed, Tulsa, Okla., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Mar. 4, 1968, Ser. No. 711,467
Int. Cl.[2] H01Q *17/00*
U.S. Cl. 343—18 A 20 Claims



20. An absorption structure for absorbing electromagnetic radiation, comprising:

means, comprising at least one sheet of radiation absorbing material, for absorbing said electromagnetic radiation; and

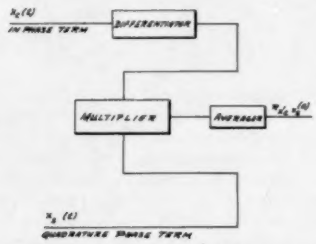
inflatable means for suitably positioning said absorbing means for optimising the absorption of said electromagnetic radiation.

4,170,011

PRECISION ANTENNA ALIGNMENT PROCEDURE

William P. Birkemeier, Madison, Wis., and Anthony E. Sill, Albuquerque, N. Mex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 28, 1977, Ser. No. 865,269
Int. Cl.[2] H04B *7/02*
U.S. Cl. 343—100 CS 6 Claims



1. The method of obtaining precise azimuthal alignment of two troposcatter antennas in a troposcatter communication system comprising the steps of

effecting by means of antenna scanning the condition in which the Doppler spectrum on a received signal is symmetric about zero doppler shift,

defocussing the beam of one of said antennas,

again effecting by means of antenna scanning the condition in which the Doppler spectrum on the received signal is symmetric about zero Doppler shift, and

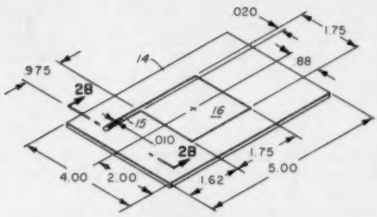
focussing said defocussed beam.

4,170,012

CORNER FED ELECTRIC MICROSTRIP DIPOLE ANTENNA

Cyril M. Kaloi, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 871,573, Jan. 23, 1978, Pat. No. 4,117,489, which is a continuation-in-part of Ser. No. 571,152, Apr. 24, 1975, abandoned. This application Jun. 26, 1978, Ser. No. 919,195
Int. Cl.[2] H01Q *1/38, 1/48*
U.S. Cl. 343—700 MS 10 Claims



1. A corner fed electric microstrip dipole antenna having low physical profile and conformal arraying capability, comprising:

a. a thin ground plane conductor;

b. a thin rectangular radiating element spaced from said ground plane;

c. said radiating element being electrically separated from said ground plane by a dielectric substrate;

d. said radiating element having a feed point located at a single corner thereof;

e. the length of said radiating element being approximately one-half waveguide wavelength and being substantially greater than the width and determining the resonant frequency along the length of said antenna, and the width determining the frequency along the width of said antenna;

f. the antenna bandwidth being variable with the width dimension of the radiating element and the spacing between said radiating element and said ground plane, said spacing between the radiating element and the ground plane having somewhat greater effect on the bandwidth than the element width; and

g. the width of said rectangular radiating element being dimensioned one-quarter waveguide wavelength or less with respect to the length thereof for producing linear polarization along the radiating element length with minimal cross polarization while being fed at said single corner feedpoint.

4,170,013

STRIPLINE PATCH ANTENNA

Lawrence M. Black, Olney, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 28, 1978, Ser. No. 929,060
Int. Cl.[2] H01Q *1/38*
U.S. Cl. 343—700 MS 14 Claims

1. An antenna, comprising:

a plurality of electrically conducting plates;

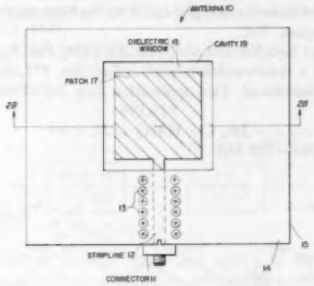
at least one of the plates perforated by an opening having a closed outline defining an aperture area;

an electrically conducting member positioned between two of the plates, adjoining and centered upon the aperture area;

the conducting member having a surface area less than the aperture area;

at least one feed element spaced between the two plates and abuttingly coupled to the conducting member;

a plug of a dielectric material completely filing the aperture; the plug having a perimeter everywhere contiguous to the closed outline;



insulating means electrically separating the conducting member and the feed element from the conducting plates; and

means for attenuating radiation from the feed element.

4,170,014

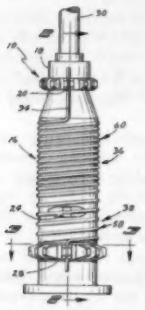
ANTENNA COIL

George R. Sully, Waseca, Minn., assignor to Antenna and Vehicular Accessories, Inc., Waseca, Minn.

Filed Feb. 1, 1978, Ser. No. 874,321

Int. Cl.[2] H01Q *9/00*

U.S. Cl. 343—749 **1 Claim**



1. An antenna coil which accepts at one end an antenna mount having a connecting outer member including an insulated center pin that connects to outer and inner conductors of a coaxial cable respectively, said coaxial cable connecting to communication equipment, and accepting at the other end a radiating element, the antenna coil comprising:

a. molded plastic body;

b. conductive top coil form insert molded into one end of said plastic body;

c. conductive bottom coil form insert molded into the other end of said plastic body whereby a coil wire is wound on said molded plastic body between said top insert and said bottom insert;

d. said molded plastic body including a coil form inner core, said top coil form insert, a coil form center contact including a tap point molded into said middle portion of said plastic and alternating lugs and slots extending downwardly in an inner portion of said plastic body to accept said center insulated pin of said antenna mount, and said bottom coil form insert are disposed on said coil form, said molded plastic body further including grooves which accept said coil wire of said antenna coil, narrow spaced grooves between said top coil insert and said coil form center contact and wide spaced grooves between said coil form center contact and said bottom coil form insert whereby plastic is molded around said core, said inserts, and said contacts forming said molded plastic body said narrow spaced grooves constitute a series coil of said antenna coil compensating for a shortened radiating element and said wide spaced grooves constitute a shunt coil of the antenna coil matching the feed point of said antenna coil to said communication equipment;

e. said top and bottom coil form inserts further including a plurality of circumferentially spaced top and bottom crimp lugs extending outwardly from said molded plastic core whereby said top crimp lug electrically connects said coil wire to said radiating element and said bottom crimp lugs electrically connects said coil wire to ground;

f. said top coil form insert further including a threaded inner portion to accommodate said threated radiating element and said bottom coil form insert further including a threaded inner portion accepting said antenna mount; and,

g. said coil wire is mechanically crimped in said crimp lugs of said top coil form insert, said tap point of said coil form center contact, and said bottom coil form insert, and said narrow spaced series coil comprises 14 turns and said wide spaced shunt coil comprises 2 and ¼ turns at 27 megahertz.

4,170,015

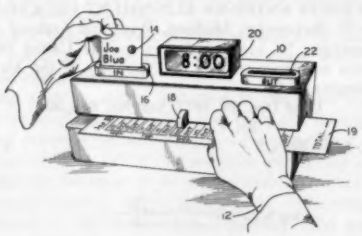
TIME CLOCK DEVICE

Jack L. Elliano, 9427 Burnet, Sepulveda, Calif. 91340, and Michael M. Levin, 6544 Coldwater Canyon Ave., N. Hollywood, Calif. 91606

Filed Mar. 28, 1977, Ser. No. 781,564

Int. Cl.[2] G01D *15/10;* **G07C** *1/06*

U.S. Cl. 346—76 PH **5 Claims**

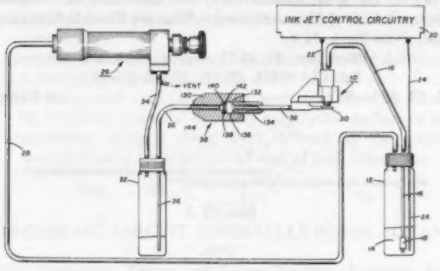


1. A self contained time clock, recorder device which contains no moving parts for use with a time card and a coded identification card combination comprising a crystal and crystal oscillator for counting seconds, a microprocessor contained within said time clock adapted to convert the counting to years, months, days, hours, minutes and seconds, a time display activated by the microprocessor, input means for the time card and coded identification card, a memory contained within said time clock activated by the microprocessor, a thermal print head for printing of output data, said time clock device adapted to input to the microprocessor the time in and time out for each employee upon insertion to the input means of a time card and a coded identification card, the microprocessor totaling the hours worked for each employee from the input data and storing the individual employee total hours worked in the memory, and reading out the total hours worked by input of a code to the input means thereby activating the memory to print out by the thermal print head onto the time card the total hours worked for each employee.

4,170,016
PRIMING APPARATUS FOR LIQUID INK WRITING INSTRUMENTS

Ronald J. Geil, Vermilion, Ohio, assignor to Gould Inc., Rolling Meadows, Ill.

Filed Dec. 12, 1977, Ser. No. 859,902
Int. Cl.² G01D *15/18*
U.S. Cl. 346—140 R **11 Claims**

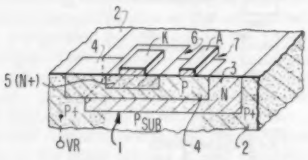


1. An improved priming apparatus for a liquid ink writing instrument, comprising:
- means for applying ink to a suitable medium;
- a source of ink for said ink applying means;
- a first conduit for delivering ink from said source to said ink applying means;
- means for causing ink to flow through said conduit means from said source;
- said ink applying means having an opening at which a droplet of ink from said first conduit is caused to form at least during priming operations; and
- at least one means located adjacent said opening in position to be contacted by said droplet as said droplet forms at said opening, for drawing away by capillary action at least one said droplet of ink formed at said opening.

4,170,017
HIGHLY INTEGRATED SEMICONDUCTOR STRUCTURE PROVIDING A DIODE-RESISTOR CIRCUIT CONFIGURATION

Wilfried Klein, Holzgerlingen; Erich Klink, Schoenaich; Volker Rudolph, Aidlingen, and Friedrich Wernicke, Schoenaich, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 23, 1978, Ser. No. 889,169
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1977, 2733615
Int. Cl.² H01L *27/04*
U.S. Cl. 357—15 **6 Claims**

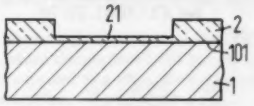


1. In an integrated circuit contained on a semiconductor chip having at least one substantially planar surface said semiconductor chip having
- a first region of a first conductivity type;
- a second region of a second conductivity type contained as a pocket within said first region;
- a third region of said first conductivity type, said third region having a first portion extending into said first region and a second portion extending into said second region;
- a fourth region of a said second conductivity type, said fourth region having a first portion extending into said second region and a second portion extending into said third region;
- a first metal contact providing an ohmic electrical connection to said third region and a Schottky barrier junction to said second region; and
- a second metal contact for providing an electrical connection to said fourth region.

4,170,018
LIGHT EMITTING SEMICONDUCTOR COMPONENT

Hartmut Runge, Kirchseeon, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 30, 1978, Ser. No. 891,559
Claims priority, application Fed. Rep. of Germany, Apr. 12, 1977, 2716143
Int. Cl.² H01L *33/00*
U.S. Cl. 357—17 **3 Claims**

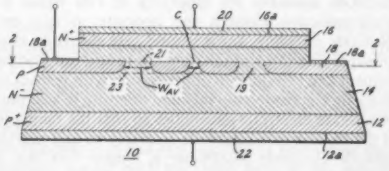


1. A light-emitting semiconductor compound comprising a semiconductor substrate of a first conductivity type, said substrate having a zone of the second conductivity type lying immediately below a planar surface of said substrate and forming a pn-junction therewith lying substantially parallel to said planar surface, a layer of Zn_2SiO_4 on said planar surface of said substrate above a portion of said zone, said layer of Zn_2SiO_4 being doped with a luminous phosphor, said Zn_2SiO_4 layer, said zone, and said substrate each being provided with a terminal electrode.

4,170,019
SEMICONDUCTOR DEVICE WITH VARIABLE GRID OPENINGS FOR CONTROLLING TURN-OFF PATTERN

Robert E. Hysell, Berwyn, and Dante E. Piccone, Glenmoore, both of Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Aug. 5, 1977, Ser. No. 822,117
Int. Cl.² H01L *29/80*
U.S. Cl. 357—22 **11 Claims**



1. A semiconductor device, which comprises:
- (a) at least three contiguous layers of semiconductor material including two outer layers and an intermediate layer disposed therebetween, said contiguous layers forming a PN junction therebetween;
- (b) a grid region in electrically contacting relation with said intermediate layer, said grid region being of opposite conductivity type in relation to said intermediate layer, said grid region including therein a plurality of openings which define channels in said intermediate layer for communicating charge carriers between said outer layers, at least some of said channels having pinch off voltages

associated therewith which are different from others of said channels such that, when said grid region is provided with an electrical potential for turning off the communication of charge carriers through said channels, a predetermined turn off characteristic is provided by the interaction of a lateral voltage drop along said grid region and said different pinch off voltages among said channels wherein current and heat concentrations at the center of said semiconductor device during turn-off are minimized; and,

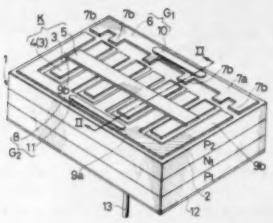
(c) means for electrically connecting to each of said outer layers and to said grid region.

4,170,020

GATE TURN-OFF THYRISTOR FOR REDUCING THE ON CURRENT THEREOF

Tetsuro Sueoka, Tokyo, and Hisao Udagawa, Hatano, both of Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo and International Rectifier Corporation, Japan Ltd., Hatano, both of, Japan

Filed Apr. 4, 1977, Ser. No. 784,642
Claims priority, application Japan, Apr. 9, 1976, 51-86052
Int. Cl.[2] H01L *29/74*
U.S. Cl. 357—38 **5 Claims**



1. A gate turn-off thyristor comprising:

a semiconductive element including at least two P-N junctions formed between a P-type diffused region and an N-type diffused region,

an anode electrode,

a cathode electrode including a plurality of divided cathode electrode assemblies including metallic layers on a cathode-emitter layer formed on a surface of said semiconductive element and a drain terminal electrode commonly connected to said metallic layers,

and a gate electrode including a plurality of separated gate electrode assemblies on the surface of said semiconductive element and surrounding said cathode electrode,

said plurality of gate electrode assemblies having a first gate electrode assembly for supplying an ON signal to said semiconductive element and opposite to said cathode electrode assembly, and a second gate electrode assembly for supplying ON and OFF signals to said semiconducitve element and provided in opposite side with respect to said first gate electrod- assembly and opposite to said plurality of cathode electrode assemblies so that the facing length of the second gate electrode assembly to said plurality of cathode electrode assemblies is longer than the facing length of the first gate electrode assembly to said plurality of cathode electrode assemblies,

said first and second gate electrode assemblies comprising respectively, a metallic layer arranged on a surface of said semiconductive element and opposite to said cathode electrode assembly,

said metallic layer of said first gate electrode assembly comprising a bridging segment spaced from one end portion of said cathode electrode assembly and at least one projection extending from the bridging segment thereof,

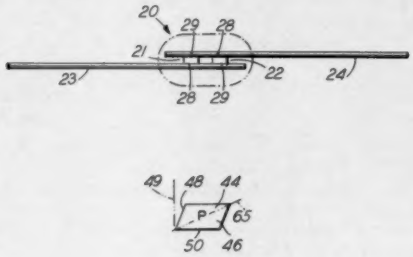
said metallic layer of said second gate electrode assembly comprising further a bridging segment spaced from the other end portion of said cathode assembly and at least one extension extending from the bridging segment along to said cathode electrode assembly and toward said projection of the first gate electrode assembly.

4,170,021

ELECTRONIC ARTICLE WITH ORIENTATION-IDENTIFYING SURFACE SHAPE

Loring E. Du Bois, Kansas City, and Lawrence D. Simpson, Summit, both of Mo., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 22, 1977, Ser. No. 863,107
Int. Cl.[2] H01L *29/06, 23/48, 29/44*
U.S. Cl. 357—55 **6 Claims**



1. An electronic article having two opposed major surfaces and poles located within the article and oriented in one of two possible directions substantially perpendicular to the surfaces, characterized by:

each of the major surfaces having a distinct surface shape with respect to the other; and

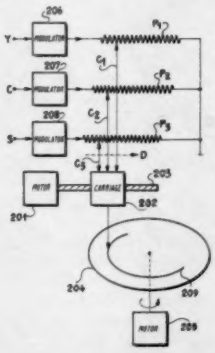
a selected one of the shapes being associated with a selected one of the poles for indicating the direction in which the poles are oriented within the article.

4,170,022

APPARATUS AND PROCESS FOR RECORDING WITH VARIABLE CORRECTION OF A TELEVISION SIGNAL HAVING THREE COMPONENTS

Sylvain Kretschmer; Jean-Pierre Lacotte, and Pierre Oprandi, all of Paris, France, assignors to Thomson-Brandt, Paris, France

Filed Feb. 10, 1978, Ser. No. 876,566
Claims priority, application France, Feb. 15, 1977, 77 04192
Int. Cl.[2] H04N *5/76;* G11B *7/00*
U.S. Cl. 358—4 **6 Claims**



1. A process for optically recording on a video-disc a television signal comprising a luminance signal, a chrominance

signal, and a sound signal, which process comprises the steps of:

moving a recording head along a radius of said video-disc towards the centre of the video-disc; said video-disc being rotating around said centre;

modulating three carrier-waves with respectively said luminance signal, chrominance signal, and sound signal;

modifying the level of the three modulated carrier-waves according to respectively three different given laws with respect to the distance of said recording head from said centre;

summing said three modulated carrier-waves for delivering a recording signal; and

controlling said recording head with said summed modulated carrier waves to optically modify the surface of said video-disc along a spiral track defined by the relative motion of said recording head and of said video-disc.

4,170,023

CARRIER AGC CIRCUIT, ESPECIALLY BURST ACC AND APC

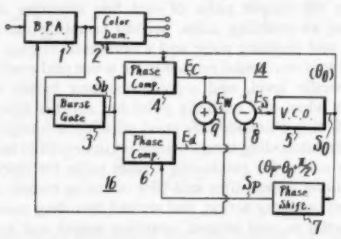
Akira Yamakoshi, Tokyo, and Takao Tsuchiya, Fujisawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jun. 13, 1978, Ser. No. 915,262

Claims priority, application Japan, Jun. 17, 1977, 52-71733

Int. Cl.[2] H04N *9/46, 9/535;* **H03G** *3/20*

U.S. Cl. 358—19 **9 Claims**



1. A burst signal level detecting circuit for an automatic color control circuit of a television receiver, comprising:

a first phase comparator having an output;

a second phase comparator having output;

means for supplying an input signal to said first and second comparators;

subtracting means receiving said output of said first phase comparator and said output of said second phase comparator for producing an output corresponding to the difference between said outputs from said respective comparators;

a variable frequency oscillator controlled by said output of said subtracting means and supplying an output thereof to said first phase comparator, so that said output of said first phase comparator corresponds to the phase relation of said output of said oscillator and said input signal;

a phase shifter supplied with the output of said variable frequency oscillator and having a phase-shifted output signal thereof supplied to said second phase comparator, so that said output of said second phase comparator corresponds to the phase relation of said phase-shifted output signal and said input signal; and

adding means supplied with the output of said first phase comparator and the output of said second phase comparator to produce an added output signal proportional to the level of said input signal.

6. An automatic gain control circuit comprising:

a gain controlled amplifier supplied with an input signal having a predetermined carrier frequency and producing an amplified output signal corresponding to said input signal;

a first and a second phase comparator, each having a first and second input terminal and an output terminal having an output thereat;

means for supplying said amplified output signal from said gain controlled amplifier to the first terminals of said first and second phase comparators;

subtracting means connected to the output terminals of said first and second phase comparators for producing an output corresponding to the difference between said outputs from said respective comparators;

a variable oscillator controlled by said output of said subtracting means and having an output signal thereof supplied to the second input terminal of said first phase comparator, so that said first phase comparator provides said output thereof in correspondence to the phase relation of said output signal of said oscillator and said amplified output signal;

a phase shifter supplied with the output of said oscillator and having a phase-shifted output signal thereof supplied to the second input terminal of said second phase comparator, so that said second phase comparator provides said output thereof in correspondence to the phase relation of said phase-shifted output signal and said amplified output signal; and

adding means connected to the output terminals of said first and second phase comparators and having an added output which is supplied as a gain control signal to said gain controlled amplifier for producing a stable output signal of said amplifier.

4,170,024

TELEVISION CONTROL SYSTEM

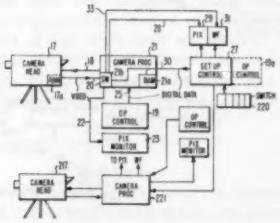
Robert A. Dischert, Burlington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 6, 1978, Ser. No. 894,011

Claims priority, application United Kingdom, May 24, 1977, 22804/77

Int. Cl.[2] H04N *5/26, 9/04*

U.S. Cl. 358—41 **19 Claims**



1. A system for a television device having a source of television sync signals for providing a plurality of adjustable control signals to the device, said system comprising:

a multiple address digital memory for storing at separate address locations separate binary signals representing the control values of said control signals;

means responsive to said sync signals for generating multiple addresses during each television field to the memory to thereby provide during each field the separate binary signals representing the separate control values for the device;

means coupled to said digital memory for converting said separate binary signal to separate amplitude level signals;

a plurality of temporary storage devices coupled to control points of the television device for storing the control values between fields;

means responsive to the television sync signals for coupling the appropriate amplitude level signal to appropriate ones of said temporary storage devices; and

means coupled to said digital memory and responsive to digital signals with addresses from an external source for

selectively changing the stored binary signals in the digital memory for adjusting the control values to the device.

18. A control system for a plurality of color television cameras comprising:

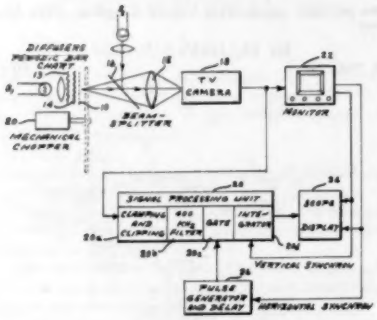
a plurality of cameras, each of said cameras including a multiple address Random Access Memory for storing in a binary digital code the control values for the camera and means for addressing said memory to provide said control values from said memory means to the controls in said camera; and

a setup control unit adapted to be coupled to each of said cameras for sending addresses to the memory for modifying the control values in the memory when desired and not interfering with the original adjusted value unless a correction is provided.

4,170,025
LOW CONTRAST MEASUREMENT APPARATUS

Fred G. Benkley, and Gerhard O. Sauermann, both of Lexington, Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 6, 1978, Ser. No. 913,187
Int. Cl.[2] H04N *7/02*
U.S. Cl. 358—139 **8 Claims**



1. A low contrast measurement apparatus comprising in combination:

a test pattern generation means providing a periodic bar chart,

a video camera means receiving said periodic bar chart, said video camera means providing a video output signal in response to said periodic bar chart,

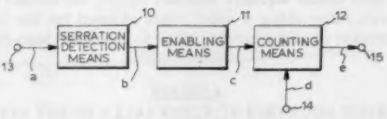
a signal processing means receiving said video output signal, said signal processing means processing said video output signal to eliminate d.c. offsets and sync pulses and filtering said video output signal at a predetermined frequency to provide a filtered video signal, said signal processing means gating said filtered video signal to eliminate transient signals, said filtered video signal is integrated over one entire picture frame to provide a linearly increasing ramp signal; and,

a display means connected to receive said ramp signal, said display means providing a visual representation of said ramp signal, said visual representation has a period equal to the frame time of said camera means and the height is proportional to the amplitude of the periodic signal.

4,170,026
CIRCUITRY FOR LINE RECOGNITION OF A TELEVISION SIGNAL

Yoshitomi Nagaoka, 11-9, Naritaminami-machi, Neyagawa-shi, Osaka-fu; Tetsuo Tomimoto, 5-37, Tanabehigashi-cho, Higashisumiyoshi-ku, Osaka-shi, Osaka-fu, and Reiichi Sasaki, 9-404, Korigaoka-jutaku, 1, Korigaoka, Hirakata-shi, Osaka-fu, all of Japan

Filed May 16, 1978, Ser. No. 906,563
Claims priority, application Japan, May 16, 1977, 52/56950; May 17, 1977, 52/57303
Int. Cl.[2] H04N *7/02, 5/48, 9/62, 9/535*
U.S. Cl. 358—188 **8 Claims**

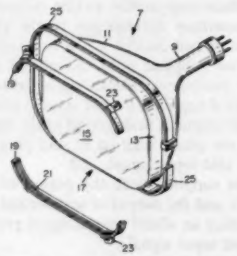


1. Circuitry for line recognition of a television signal comprising; serration detecting means which receives a composite sync pulse for separating a portion of the serration of the vertical sync pulse, first counting means which is coupled to said serration detecting means for producing an output pulse at specific time interval between two successive output pulses of said serration detecting means, enabling means which is triggered by the output pulse of said first counting means for producing an enabling pulse, second counting means which receives said enabling pulse and a horizontal retrace pulse for counting said horizontal retrace pulse when said enabling pulse has a specific level, said second counting means becoming quiescent when said enabling pulse has another specific level and producing a line identification pulse on a desired horizontal line, first decoding means which is connected to said second counting means for producing a reset pulse for resetting said first counting means after said first counting means completes its desired counting action, and second decoding means which is connected to said second counting means and produces a reset pulse for resetting said enabling means after said second counting means produces the desired line identification pulse.

4,170,027
IMPLOSION RESISTANT CATHODE RAY TUBE AND FABRICATING PROCESS

O. Wendell Amstutz, Lima; William A. Dickinson, and James F. Kreidler, both of Ottawa, all of Ohio, assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Mar. 27, 1978, Ser. No. 890,080
Int. Cl.[2] H04N *5/65*
U.S. Cl. 358—246 **5 Claims**



1. A cathode ray tube having an envelope resistant to fracture and implosion upon breakage comprising

a funnel member having a neck portion with at least one electron gun sealed therein and tapering to a flared portion;

a face plate member having a viewing portion joined to a rearwardly extending skirt portion sealed to said flared portion of said funnel member;

a pair of substantially flat rimbands each having at least one bracket member affixed thereto at a given positional location and an adhesive affixed to the inner surface thereof, said rimbands formed to encircle and adhere to said skirt portion of said face plate member rearwardly of the jointure of said viewing and skirt portions of said face plate member; and

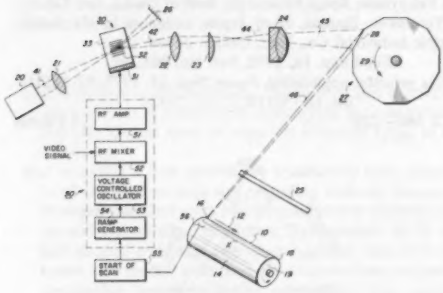
a strap member encircling and applying tension to said pair of rimbands to effect compression thereof against said skirt portion of said face plate member.

4,170,028

FACET TRACKING IN LASER SCANNING

Leonard C. DeBenedictis, Los Angeles, and Richard V. Johnson, Pasadena, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 6, 1977, Ser. No. 785,258
Int. Cl.[2] H04N *3/08, 3/10*
U.S. Cl. 358—285 **10 Claims**



1. An improved flying spot scanning system for recording information from an electrical signal onto a scanned medium comprising:

means for both providing a beam of radiant energy;

means for modulating said beam in accordance with the information content of said electrical signal and deflecting said modulated beam in response to a drive signal;

means for focusing said modulated beam to a spot upon the surface of a light sensitive medium;

scanning means having at least one reflective surface positioned in the optical path of said modulated beam for rotating said reflective surface a desired angle in order to scan said spot across said medium to impart the information content of said spot to said medium;

means for generating a signal representing the start of said scan; and drive signal means responsive to said start of scan signal and operatively connected to said modulating means for producing a drive signal, said drive signal causing said modulated beam to track a discrete area of said reflective surface during the rotation and translation of said reflective surface during said scan.

4,170,029

MULTIPLE SPEED DRIVE MECHANISM FOR CASSETTE RECORDERS

Donald D. Kahn, Camarillo, Calif., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Aug. 23, 1978, Ser. No. 936,171
Int. Cl.[2] G11B *15/28, 15/44, 19/26*
U.S. Cl. 360—96.1 **5 Claims**

1. A driving mechanism of a cassette-type magnetic tape recorder suitable for voice logging use comprising

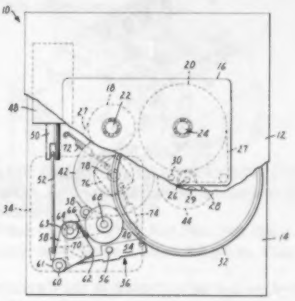
(a) a frame,

(b) a flywheel-capstan assembly including

(i) an axially positioned shaft rotatably mounted on said frame and extending to form a capstan engageable with a pinch roller for advancing a magnetic tape positioned therebetween when the flywheel-capstan assembly is driven, and

(ii) a flywheel mounted on said shaft having a plurality of perimeter portions spaced along the axis thereof for engaging suitable drive means,

(c) drive means, including a drive shaft adapted to be driven at a relatively constant speed, having a plurality of different axial positions, and a plurality of idler wheels, each of which is rotatably mounted on a carriage movable with respect to said frame, enabling the simultaneous engage-



ment of each of said idler wheels with a different one of the axial positions of said drive shaft and enabling the independent engagement of a given one of said idler wheels with a matching one of said perimeter portions of said flywheel, and

(d) means for selectively moving a given carriage to engage one of said idler wheels with one of said perimeter portions of said flywheel and for disengaging the remaining idler wheels from the remaining perimeter portions, wherein said perimeter portions of said flywheel and said axial portions of said drive shaft are selected to provide different ratios therebetween, whereby the flywheel-capstan assembly may be caused to be uniformly driven at different angular velocities enabling alternative drive conditions.

4,170,030

DRIVE MACHINE MOVING MAGNETIC DISKS ONLY PARTIALLY THEREIN FOR DATA TRANSFER

Daniel O. Castrodale, and Thomas R. Fournier, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 20, 1978, Ser. No. 888,437
Int. Cl.[2] G11B *5/012, 5/82*
U.S. Cl. 360—98 **6 Claims**

1. A machine for providing data transference with disk-jacket assemblies which include information carrying disks rotatably disposed in thin flat rectangular jackets having a certain length measured parallel with a base edge of the assembly, each of said jackets having coincident central holes in its two thicknesses and having an elongate hole in one jacket thickness extending parallel with a base edge of the jacket and between an adjoining front edge of the jacket and the center of said central holes, said machine comprising:

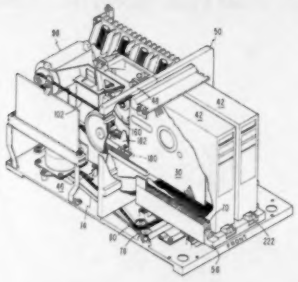
storing means for storing a stack of said disk-jacket assemblies,

position defining means defining a data transferring position of a disk-jacket assembly in the plane of one of the disk-jacket assemblies in said stack and which is located closer to the position of the disk-jacket assembly in said stack then the length of the jacket and measured along the base

edge of the disk-jacket assembly from the front edge of the disk-jacket assembly in said stack to the front edge of the disk-jacket assembly when in said data transferring position so that said central holes and said elongate hole of the disk-jacket assembly when in said data transferring position ae exposed with respect to the remaining disk-jacket assemblies in said stack and the disk-jacket assembly when in said data transferring position retains its place in said stack,

means for moving said storing means and said position defining means with respect to each other so that any of said disk-jacket assemblies in said stack may be in said plane,

means operative to move the disk-jacket assembly which is



in said plane and in said stack in the direction of its base edge with its front edge foremost for said distance less than the base edge length into said data transferring position so that said central holes and said elongate hole of the disk-jacket assembly are exposed and so that the disk-jacket assembly retains its place in said stack,

drive means positioned outside of said stack so as to extend through said central holes in the jacket of the disk-jacket assembly in said data transferring position for driving the disk thereof, and

a transducer positioned outside of said stack so as to be moveable into said elongate hole in the disk-jacket assembly in said data transferring position for a transfer of data with respect to the disk thereof.

4,170,031

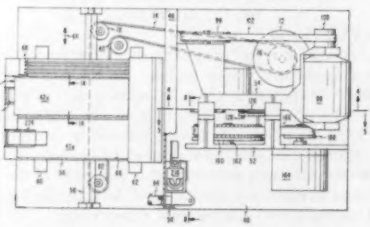
LOADING MECHANISM FOR MAGNETIC DISKETTES

Wallace E. Beuch, Pine Island; Curtis A. Larson, Rochester; Michael N. Zell, Rochester, and Thomas R. Fournier, Rochester, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 20, 1978, Ser. No. 888,603

Int. Cl.[2] G11B *17/00, 5/82, 25/04*

U.S. Cl. 360—98 **15 Claims**



1. A machine for providing data transference with thin flat information carrying disk units including:

means for holding such a disk unit in an original position thereof,

means for grasping the disk unit and including a pair of arms extending side by side from a place of mutual attachment to distal arms ends having outwardly diverging cam surfaces thereon and resilient means for urging the distal arm ends together,

driving means for reciprocatively moving said grasping means in a certain path and in a first direction from a position opposite and spaced from a side edge of the disk unit toward said side edge of the disk unit while the disk unit is in its said original position so that said outwardly diverging cam surfaces cam over this side edge of the disk unit and said distal arm ends frictionally engage the opposite side faces of the disk unit so that the grasping means grasps the disk unit and the driving means then moving said grasping means in the second opposite direction in said path to thereby pull the disk unit into a final data transferring position, and

a transducer for transferring data with respect to the disk unit when it is in its said data transferring position.

4,170,032

MAGNETIC HEAD AND METHOD FOR PREPARING THE SAME

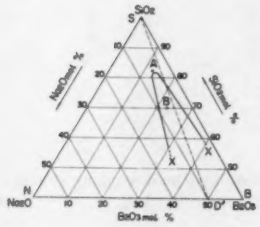
Kazuo Yokoyama; Ryuji Nishiyama, both of Osaka, and Taketoshi Yonezawa, Ibaraki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 18, 1978, Ser. No. 943,397

Claims priority, application Japan, Sep. 19, 1977, 52-112815

Int. Cl.[2] G11B *5/251, 5/42*

U.S. Cl. 360—120 **4 Claims**



1. A magnetic head having a sputter-deposited glass film at the gap forming area of the magnetic core, said glass film being made of borosilicate glass having the composition of 65 to 85 mol % SiO_2 and 8 to 30 mol % B_2O_3 and containing 2 to 15 mol % of alkali metal oxides Na_2O and K_2O and 0.1 to 5 mol % of Al_2O_3, with the molar ratio of boron oxide to alkali metal oxides being defined by:

$$0.05 < \frac{Na_2O + K_2O}{B_2O_3 + Na_2O + K_2O} < 0.4$$

4,170,033

MULTI-TRACK HEAD WITH SHIELDING ELEMENTS INTERCONNECTED WITH LOW RESISTANCE CONDUCTIVE PATHS

Peter C. Ridgway, Staines, and Derek F. Case, Sunbury, both of England, assignors to Data Recording Instrument Company Limited, Staines, England

Filed Mar. 13, 1978, Ser. No. 886,271

Claims priority, application United Kingdom, Mar. 15, 1977, 10796/77

Int. Cl.[2] G11B *5/115, 5/22, 5/28*

U.S. Cl. 360—121 **6 Claims**

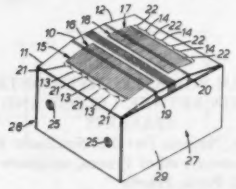
1. A magnetic head assembly consisting of a magnetic read head, a magnetic write head and electrically conductive shielding co-operating with said magnetic heads to reduce the level

of signals induced directly in the read head as a result of energisation of the write head, said assembly including

a plurality of first electrically conductive non-magnetic shield elements of planar form and a plurality of planar laminations of magnetic material arranged in a stack with the conductive elements and the magnetic laminations parallel to one another, the magnetic laminations being positioned alternately with the conductive elements and said stack extending between said read head and said write head;

a second electrically conductive non-magnetic shield element positioned so that the read head lies between said stack and said second element;

a third electrically conductive non-magnetic shield element positioned so that the write head lies between said stack and said third element;



each conductive shield element having first and second ends, the first ends of adjacent elements lying in close proximity and the second ends of adjacent elements lying in close proximity;

and including a first electrically conductive layer plated on to all of said first ends and extending without interruption between said first ends of said conductive elements and a second electrically conductive layer plated on to all of said second ends and extending without interruption between said second ends, said conductive elements and said conductive layers providing continuous low resistance electrically conductive paths extending around said read head and said write head for circulating currents induced in the conductive shielding.

4,170,034

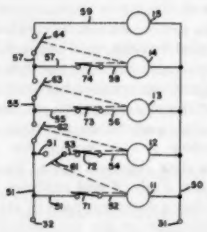
MULTILAMP PHOTOFLASH UNIT WITH MORE RELIABLE CIRCUIT ARRANGEMENT

Boyd G. Brower, Williamsport, Pa., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 15, 1977, Ser. No. 860,759

Int. Cl.² G03B *15/02*

U.S. Cl. 362—12 **6 Claims**



1. A multilamp photoflash unit having a pair of input terminals adapted for connection to a source of firing pulses, and n flashlamps and n−1 normally open switches connected in a circuit combination across said input terminals for providing sequential flashing of said lamps in response to successively applied firing pulses, each of said normally open switches being responsive to the flashing of an associated lamp to form a closed circuit connection, and each of said lamps being connected in common to one of said input terminals, wherein the improvement comprises a circuit combination in which a first one of said lamps is connected directly across said input terminals, a first one of said normally open switches in series-connected with a second one of said lamps across said input terminals, said first switch being associated with said first lamp, the second through (n−1)th of said normally open switches are series-connected in that order with the nth one of said lamps across said input terminals and parallel-connected with the series connection of said first normally open switch and said second lamp, and the third through (n−1)th of said lamps are each series-connected with a respective one of the second through (n−2)th of said normally open switches, said second through (n−1)th switches being associated with said second through (n−1)th lamps, respectively.

4,170,035

DISPLAY LAMP HAVING A TRANSLUCENT ENVELOPE

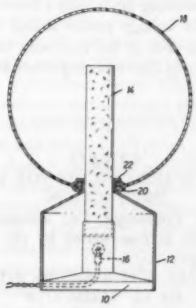
Edward C. Walker, Ringwood, England, assignor to Crestworth Limited, Dorset, England

Filed Oct. 11, 1977, Ser. No. 840,744

Claims priority, application United Kingdom, Oct. 13, 1976, 42567/76

Int. Cl.² F21V *7/04*

U.S. Cl. 362—31 **10 Claims**



1. A display lamp comprising:

(a) a base,

(b) a container of light transmitting material carried by and upstanding from said base, said container having a lower wall,

(c) a light transmitting liquid within said container,

(d) a plurality of insoluble light reflecting particles suspended within said liquid, said particles and liquid having substantially the same specific gravity,

(e) a heat producing light source mounted within said base adjacent said lower wall of said container for transmitting light through said liquid for reflection by said particles outwardly through said container as multiple light beams and for heating said liquid to create convection currents which agitate said particles for imparting movement to the light beams reflected thereby and varying the size and shape thereof, and

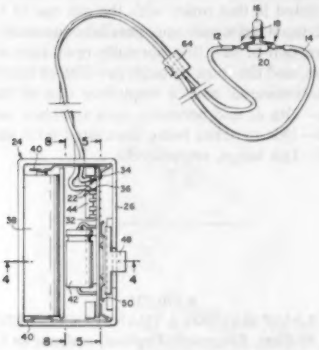
(f) an envelope positioned in outwardly-spaced substantially surrounding relationship to said container and having a substantial translucent area acting as a screen on which said light beams reflected by said particles are projected to produce thereon a continuously varying random light pattern visible externally of said envelope.

4,170,036

ARTICLE OF JEWELRY WITH FLASHING DIODE

Howard Sussel, 411 E. 53rd St., New York, N.Y. 10022

Filed Aug. 7, 1978, Ser. No. 931,477
Int. Cl.[2] F21L *15/08*
U.S. Cl. 362—104 **12 Claims**



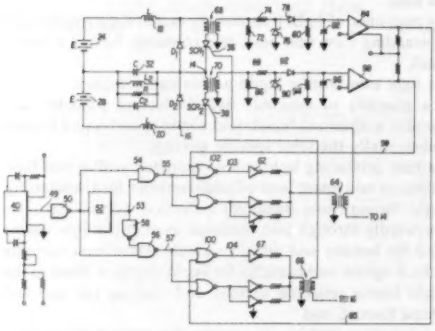
1. An article of jewelry comprising first and second lengths of electrically conductive wire; a light emitting diode connected across a first set of the free ends of said lengths of wire; a restraining diode connected across said lengths of wire inwardly of and proximate to the connection between said light emitting diode and said lengths of wire, said restraining diode being connected in opposition to the direction of current flow through said light emitting diode; and a linear integrated oscillator circuit and low voltage power source connected across the other set of free ends of the said wire lengths adapted to intermittently flash said light emitting diode at a predetermined frequency.

4,170,037

LOCK-OUT LOGIC CIRCUIT FOR INVERTER PROTECTION

Donald S. Kimmel, Pittsburgh, Pa., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Aug. 4, 1978, Ser. No. 931,067
Int. Cl.[2] H02M *1/18*
U.S. Cl. 363—57 **2 Claims**



1. A lock-out logic circuit for a resonant-feedback inverter system wherein at least one pair of load bearing switching elements is provided, each of the load bearing switching elements of the at least one pair having a trigger input terminal to which is applied a trigger signal, comprising:

current sensing means for detecting the presence of a load current in the load bearing switching elements;

said current sensing means comprising at least one pair of current pulse transformers for each of said at least one pair of load bearing switching elements, each of said current pulse transformers having a primary winding in series connection with one of said load bearing switching elements, and a second winding; and

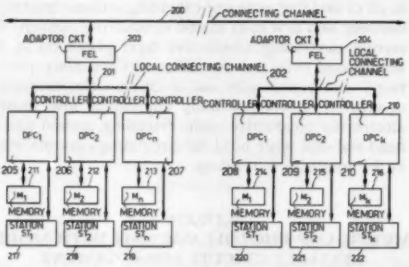
said current sensing means further comprising at least one pair of pulse stretching circuits coupled to the secondary winding of said at least one pair of current pulse transformers, each pulse stretching circuit producing a pulse output whenever current exceeding a predetermined threshold exists in the primary of said current pulse transformers, said output of said pulse stretching circuit being maintained for a predetermined time period after the cessation of current through said current pulse transformers.

4,170,038

APPARATUS FOR SELECTIVE CONTROL OF INFORMATION BETWEEN CLOSE AND REMOTE STATIONS

Claude J. Bouvier, Nogent; David J. Smithson, Buc, and Jean-Paul Luais, Fontenay, all of France, assignors to Compagnie Honeywell Bull, Paris, France

Continuation-in-part of Ser. No. 521,021, Nov. 5, 1974. This application Jan. 26, 1976, Ser. No. 652,315
Claims priority, application France, Jan. 29, 1975, 75 02801
Int. Cl.[2] G06F *3/04*
U.S. Cl. 364—200 **8 Claims**



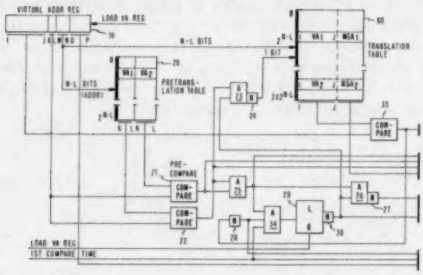
1. Apparatus for controlling selective exchange of information between a plurality of closely located stations and at least one station remote from the closely located stations comprising a first data channel for connecting the closely located stations to each other so that signals are coupled between the closely located stations via the first data channel, a second data channel connected to the remote station, a common adapter circuit for the closely located stations, said adapter circuit including means for coupling signals between the first and second data channels so that signals are coupled between all of the closely located stations and the remote station via the first data channel, the adapter circuit and the second data channel; each of said stations including: a data module for coupling signals between one of the data channels and at least one peripheral device at that station, each of said modules including a data processing unit having a memory, each of said memories storing a program dependent on the configuration of peripheral devices at the station; each of the data processing units including: means for deriving an enabling order for a module at another station, said enabling order being coupled to the another station via at least one of the data channels, means for executing the program stored in the memory of the unit in response to an order derived by another unit and coupled to the unit of the station via at least one of the data channels, and means for controlling exchanges of signals between the units of each of the stations in such a way that selective exchange of

signals between the stations is carried out by a succession of information exchange controls by the modules of all of the stations.

4,170,039
VIRTUAL ADDRESS TRANSLATION SPEED UP TECHNIQUE

Thomas J. Beacom, Rochester; Douglas M. Kindseth, Stewartville, and Glen R. Mitchell, Pine Island, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 17, 1978, Ser. No. 925,148
Int. Cl.² G06F *9/10*
U.S. Cl. 364—200 **8 Claims**



1. Address translation apparatus comprising:

address register means for storing an address to be translated where said address has a fixed number of bits,

an addressable translation table for storing pairs of address translate candidates alongside with associated translated addresses for each translatable address, said pairs of address translate candidates and translated addresses being stored in noncontiguous locations in said translation table,

an addressable pre-translation table for storing pairs of partial addresses at single addressable locations,

means for simultaneously applying address signals to said translation table and said pre-translation table based upon the states of a first predetermined group of bits in said address register means,

a pair of precompare logic means connected to compare an addressed pair of partial addresses with a second predetermined group of bits in said address register means, each precompare logic means of said pair of precompare logic means generating a comparison result signal indicating an equal or unequal comparison,

means for applying said comparison result signal from one of said precompare logic means aa an address signal to said translation table to complete the addressing of said translation table whereby the address translate candidate and associated translated address are read from the addressed location,

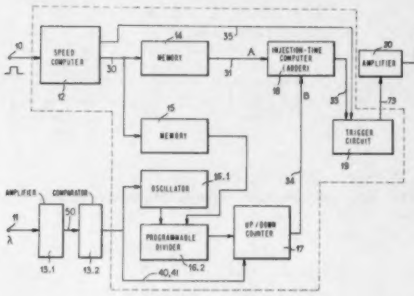
compare logic means for comparing a third predetermined group of bits in said address register means with the address translate candidate read from the addressed location in said translation table, and for generating a comparison result signal indicating an equal or unequal comparison, and

means for inverting said result signal from said one of said precompare logic means in response to said result signal from said compare logic means indicating an unequal comparison whereby the address to said translation table is changed and the paired translate candidate and associated translated address are read from said translation table.

4,170,040
DIGITAL COMPUTER FOR CALCULATING THE OPTIMAL RICHNESS OF THE AIR/FUEL MIXTURE FOR INTERNAL COMBUSTION ENGINES

Marc Leblanc, Montreuil, and Bernard Lepretre, Boulogne, both of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed Jan. 10, 1978, Ser. No. 868,445
Claims priority, application France, Jan. 26, 1977, 77 02099
Int. Cl.² F02D *33/02;* G06F *15/20*
U.S. Cl. 364—442 **5 Claims**



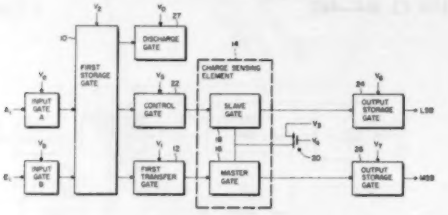
1. An air-fuel mixture electronic control system for use with an internal combustion engine, and adapted for control of the opening time of a solenoid operated air injection valve (21) in the mixture induction system of the engine, said control system comprising pulse generating means (10) responsive to the engine rotational velocity and a voltage generating probe (11) responsive to the chemical composition of the exhaust gases of the engine for detecting either a rich or lean state of the air-fuel mixture, wherein there is provided an address computer (12) having an input responsive to said pulse generating means pulses and for producing addresses which are a function of said pulses representative of the engine rotational velocity, a first memory (14) containing correction data related to the stoichiometric conditions of combustion of the mixture as a function of the engine rotational velocity, said first memory having its selection inputs connected to the outputs of said address computer (12), a second memory (15) having its selection inputs connected to the outputs of said address computer (12) and containing stored numerical data dependent upon the engine rotational velocity, said second memory having its outputs connected to regulation means cooperating with said probe (11) and said regulation means comprising an oscillator (16.1), a programmable divider (16.2) having its clock input connected to said oscillator (16.1) and its programmable inputs connected to the outputs of said second memory (15), and an up-down counter (17) having its clock input connected to the output of said programmable divider (16.2), and its up-counting and down-counting input responsive to the rich state and the lean state of the air-fuel mixture as detected from the probe (14) through a voltage comparator (13.2), and a digital adder (18) having its inputs connected to the outputs of said up/down counter (17) to sum up the data issued from said first memory and from said up-down counter, respectively, as first-order and second-order correction data, and a periodically operated trigger circuit (19) for triggering said solenoid operated air injection valve (21), said trigger-circuit (19) being connected and responsive to the outputs of said digital adder (18) to determine the opening time of said solenoid operated air injection valve.

4,170,041

LOGIC GATE UTILIZING CHARGE TRANSFER DEVICES

Roland J. Handy, Northridge, and Thomas A. Zimmerman, Palos Verdes Peninsula, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Sep. 17, 1976, Ser. No. 724,140
Int. Cl.[2] G06F *7/50*; H01D *11/14*
U.S. Cl. 364—784 **7 Claims**



1. A logic gate, comprising:

(a) a first storage gate capable of receiving a first and a second charge packet, each containing a predetermined quantity of charge Q representative of a binary bit;

(b) a first transfer gate coupled to said first storage gate for allowing the transfer therethrough of charge at said first storage gate in excess of the quantity Q;

(c) a charge sensing element having a master gate and a slave gate, said master gate being responsive to the excess of charge above said quantity Q that is transferred by said first transfer gate, said slave gate being directly connected to said master gate and acting as a transfer gate for charge transfer if, and only if, no charge is present at said master gate, and acting as a barrier gate for charge transfer if, and only if, charge is present at said master gate;

(d) a control gate coupling said first storage gate to said slave gate, said control gate having a barrier state for inhibiting the transfer of charge from said first storage gate to said slave gate during the time interval required for charge from said first storage gate to reside at said master gate, said control gate also having a transfer state for the transfer of charge after the expiration of said time interval, and

(e) means coupled to at least one of said slave and master gates for utilizing the individual charge packets Q that are present at said slave and master gates.

DESIGN PATENTS

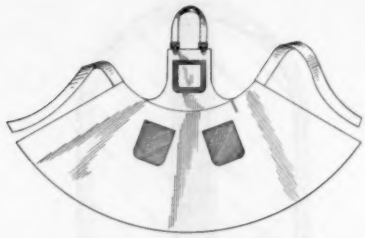
GRANTED OCT. 2, 1979

ERRATA

For CLASS	See PATENT NO.
D19-035	253,055

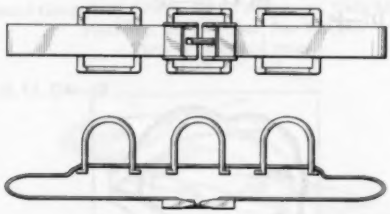
OCTOBER 2, 1979

253,016
JUMPER
Michael B. Frank, Chicago, Ill., assignor to Uniforms to You & Co.
Filed Nov. 24, 1976, Ser. No. 744,644
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—146

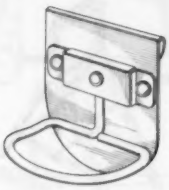


253,017
SPORTS SHOE
Giovanni Marchesi, 29 Vernham Ct., Willowdale, Canada (M2L 2B3)
Filed Dec. 5, 1977, Ser. No. 857,798
Claims priority, application Canada, Jun. 6, 1977, 0606776
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—309

253,018
TENNIS BALL CARRIER
Spencer H. Robley, 1034 Pine St., Santa Monica, Calif. 90405
Filed Jan. 13, 1978, Ser. No. 869,386
Term of patent 14 years
Int. Cl. D02—*07*
U.S. Cl. D2—400

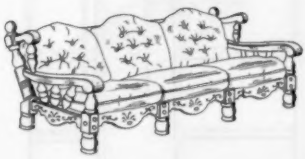


253,019
TOOL HOLDER
George Hillinger, Hollywood, Calif., assignor to Action Leathercraft, Inc.
Filed Mar. 10, 1978, Ser. No. 885,459
Term of patent 14 years
Int. Cl. D02—*99*
U.S. Cl. D2—400



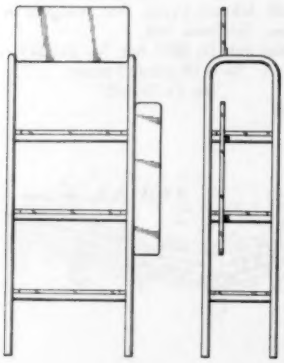
253,020
BELT BUCKLE
Ryk Van Brouwer, Los Angeles, Calif., assignor to Raintree Buckle & Jewelry, Inc., Los Angeles, Calif.
Filed Oct. 28, 1977, Ser. No. 846,625
Term of patent 14 years
Int. Cl. D02—*07*
U.S. Cl. D2—431

253,021
SEAT OR SIMILAR ARTICLE
Stanley P. Nash, Johnson Creek, Wis., assignor to Schweiger Industries, Inc., Jefferson, Wis.
Filed Jul. 22, 1977, Ser. No. 818,247
Term of patent 7 years
Int. Cl. D6—*01*
U.S. Cl. D6—62

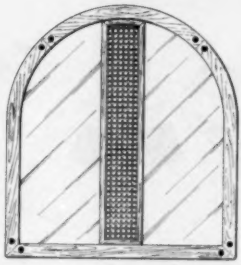


253,022
COMBINED RACK AND DISPENSER FOR SPOOLED WIRE
Allen E. Sligh, 2518 Chester St., Alameda, Calif. 94501
Filed May 2, 1977, Ser. No. 793,180
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—85

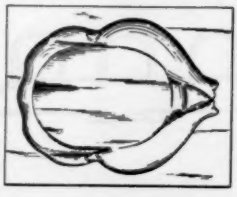
253,023
DISPLAY RACK
Myron L. Denhoff, New York, N.Y., assignor to Myden Industries, Inc., New York, N.Y.
Filed Jun. 14, 1978, Ser. No. 915,196
Term of patent 3½ years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—186



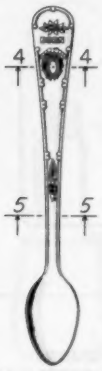
253,024
MIRROR
Huey T. Keller, High Point, N.C., assignor to Vaughan Furniture Company, Inc., Galax, Va.
Filed Aug. 8, 1977, Ser. No. 822,612
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—234



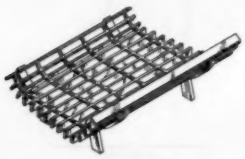
253,025
FOOD MOLD
Reuben Lewis, 105-52 Flatlands 7th St., Brooklyn, N.Y. 11236
Filed Mar. 18, 1977, Ser. No. 779,256
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—44



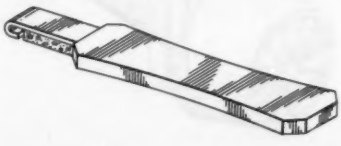
253,026
SPOON OR SIMILAR ARTICLE
John L. Czasonis, Sherrill, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed May 19, 1977, Ser. No. 798,436
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137



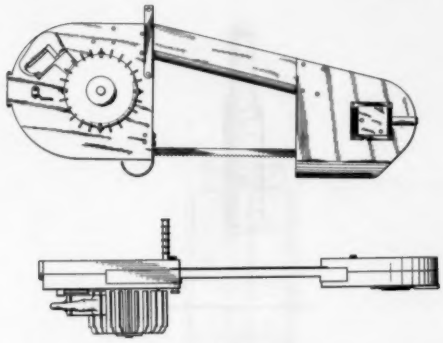
253,027
FIREPLACE GRATE
David N. Whitaker, 3013 Western Dr., Garland, Tex. 75042
Filed Nov. 7, 1977, Ser. No. 849,489
Term of patent 3½ years
Int. Cl. D7—*08*
U.S. Cl. D7—207



253,028
PULL TAB CAN OPENER
Daniel Gunn, 1435 Liberty Rd., Youngstown, Ohio 44505
Filed Sep. 28, 1977, Ser. No. 837,163
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—40

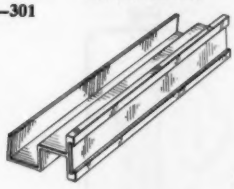


253,029
CARCASS SPLITTING BAND SAW
Mark W. Wikoff, 9685 Ross Ave., Montgomery, Ohio 45242
Filed Apr. 6, 1977, Ser. No. 785,043
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—66



253,030
COVER FOR HANDLE OF A SCREW DRIVER
Carl-Arne Breger, Malmo, Sweden, assignor to Sandvik Aktiebolag, Sandviken, Sweden
Filed Mar. 18, 1977, Ser. No. 779,239
Term of patent 14 years
Int. Cl. D8—*04*
U.S. Cl. D8—83

253,031
COMBINED CLIP-ON HANDLE AND PANEL INSERT FOR CABINET DOORS, DRAWERS OR THE LIKE
Edward Gidseg, 22 Park Pl., Great Neck, N.Y. 11021
Filed May 3, 1977, Ser. No. 793,437
Term of patent 14 years
Int. Cl. D8—*06*
U.S. Cl. D8—301



253,032
COSMETIC CONTAINER
John C. White, Easton, Conn., assignor to The Bridgeport Metal Goods Manufacturing Company, Bridgeport, Conn.
Filed Aug. 15, 1977, Ser. No. 824,865
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—57

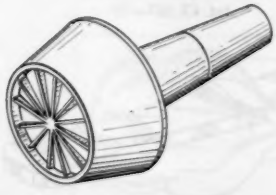
253,033
BOTTLE
Richard E. Meyer, Chicago, Ill., and Pierre Dinand, Levallios, France, assignors to Jovan, Inc.
Filed Aug. 4, 1977, Ser. No. 815,804
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—60

253,034
BOTTLE
Richard E. Meyer, Chicago, Ill., and Pierre Dinand, Levallios, France, assignors to Jovan, Inc.
Filed Aug. 4, 1977, Ser. No. 815,809
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—60

253,035
COMBINED BOTTLE AND CAP
Richard E. Meyer, Chicago, Ill., and Pierre Dinand, Levallios, France, assignors to Jovan, Inc.
Filed Aug. 4, 1977, Ser. No. 815,807
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—63

253,036
COMBINED BOTTLE AND CAP
Richard E. Meyer, Chicago, Ill., and Pierre Dinand, Levallios, France, assignors to Jovan, Inc.
Filed Aug. 4, 1977, Ser. No. 815,808
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—63

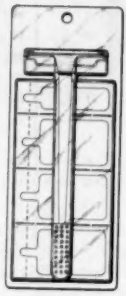
253,037
BOTTLE OR SIMILAR ARTICLE
Victor Barouh, 111 Wheatley Rd., Old Westbury, N.Y. 11568
Filed Jul. 21, 1977, Ser. No. 817,775
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—128



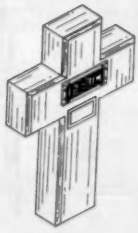
253,038
BOTTLE
James E. Plummer, Toledo, Ohio, assignor to Owens-Illinois, Inc.
Filed Jun. 2, 1977, Ser. No. 802,766
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—148

253,039
COSMETIC CONTAINER
John C. White, Easton, Conn., assignor to The Bridgeport Metal Goods Manufacturing Company, Bridgeport, Conn.
Filed Aug. 15, 1977, Ser. No. 824,867
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—168

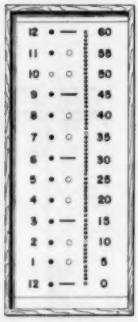
253,040
TOILETRY BLISTER PACKAGE
Erick-Pierre Fournier, and Ethel V. Hill, both of 30 Park Ave., New York, N.Y. 10016
Filed Jul. 25, 1977, Ser. No. 818,979
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—192



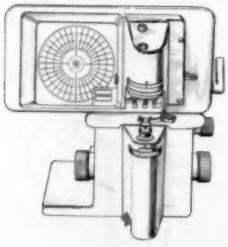
253,041
DIGITAL CLOCK
Stanley Ellard, 1900 Rice Mine Rd., Apt. 816, Tuscaloosa, Ala. 35406
Filed Jun. 13, 1977, Ser. No. 806,018
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



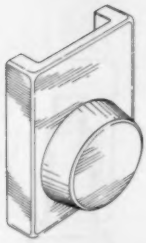
253,042
CLOCK
Graham M. Fee, 250 Ansel Rd., Geneva, Ohio 44041
Filed Sep. 22, 1977, Ser. No. 835,838
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—15



253,043
OPTICAL LENS VERTEX MEASURING PROJECTOR
Siegfried Gelius, Munich, Fed. Rep. of Germany, assignor to Optische Werke G. Rodenstock
Filed Aug. 4, 1977, Ser. No. 821,953
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1977, 10886
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—46

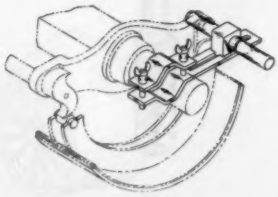


253,044
THERMOSTAT REGULATOR
Bruce C. Hewson, Suite 10, 90 Kippendavie Ave., Toronto, Ontario, Canada (M4L 3R5)
Filed Nov. 28, 1977, Ser. No. 855,475
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—50



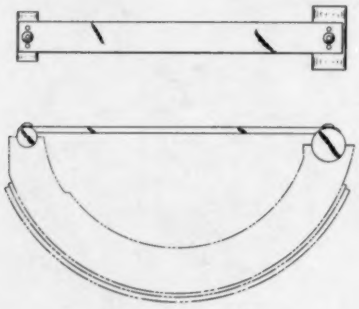
253,045
COMBINED POCKET RULER AND MAGNIFIER
Brooks Rizer, Dalton, Ga., assignor to Textile & Industrial Sales, Inc., Dalton, Ga.
Filed Aug. 12, 1977, Ser. No. 823,992
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—62

253,046
SPIDER GAUGE FOR HEAVY DUTY VEHICLE BRAKES
Thomas E. Morgan, 11060 Clinton River Dr., Sterling Heights, Mich. 48078
Filed Jan. 9, 1978, Ser. No. 867,915
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64



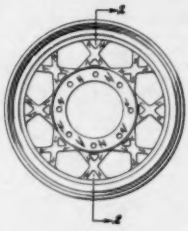
253,047
I.D. BRAKE DRUM GAUGE FOR HEAVY DUTY VEHICLE BRAKES
Thomas E. Morgan, 11060 Clinton River Dr., Sterling Heights, Mich. 48078
Filed Jan. 9, 1978, Ser. No. 867,916
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64

253,048
HEAVY DUTY VEHICLE BRAKE SHOE GAUGE
Thomas E. Morgan, 11060 Clinton River Dr., Sterling Heights, Mich. 48078
Filed Jan. 10, 1978, Ser. No. 868,327
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64

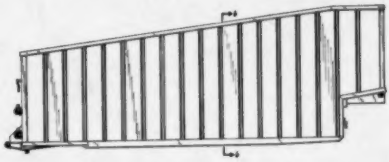


253,049
PYRAMID FINGER RING
Esther Escher, 812 S. Harrison St., Mason City, Iowa 50401
Filed Aug. 1, 1977, Ser. No. 820,803
Term of patent 14 years
Int. Cl. D11—*01*
U.S. Cl. D11—34

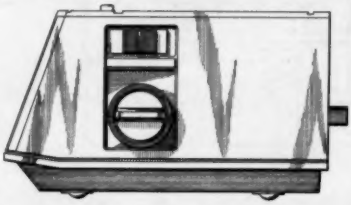
253,050
VEHICLE WHEEL
Kurt W. Lohmeyer, Fullerton, Calif., assignor to Tru-Spoke Inc., Anaheim, Calif.
Filed Oct. 11, 1977, Ser. No. 840,555
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205

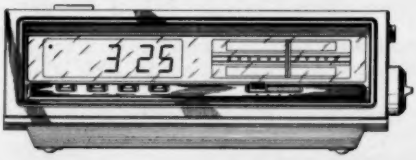


253,051
FLUID TRANSPORT TANK
Raymond E. Pletcher, 705 NW. 5th, Wilson, Okla. 73463
Filed Dec. 12, 1977, Ser. No. 859,658
Term of patent 14 years
Int. Cl. D12—*10*
U.S. Cl. D12—95

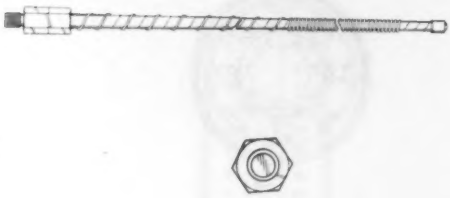


253,052
CLOCK RADIO OR SIMILAR ARTICLE
John T. Houlihan, Fayetteville, N.Y. assignor to General Electric Company
Filed Jun. 8, 1977, Ser. No. 804,534
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—73

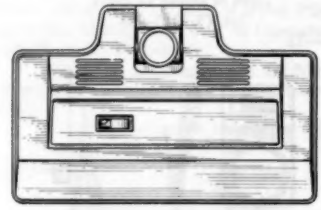


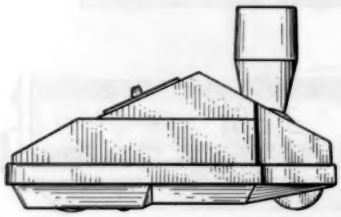


253,053
VEHICLE RADIO ANTENNA
Thomas J. Wilson, 1055 N. First Pl., Hermiston, Oreg. 97838
Filed Oct. 25, 1977, Ser. No. 845,162
Term of patent 14 years
Int. Cl. 14—*99*
U.S. Cl. D14—90

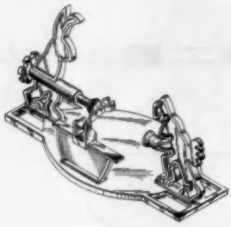


253,054
VACUUM CLEANER NOZZLE
Thomas H. Stevens, Closter, and George L. Horton, Englewood, both of N.J., assignors to General Signal Corporation, Stamford, Conn.
Filed Nov. 21, 1977, Ser. No. 853,972
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—64

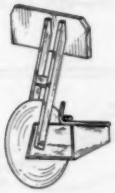




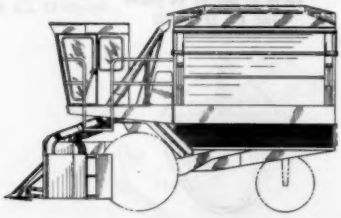
253,055
EGG DECORATING DEVICE
Stanley J. Fudro, 2322 Second St. NE., Minneapolis, Minn. 55418
Filed Dec. 16, 1977, Ser. No. 861,180
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D19—35



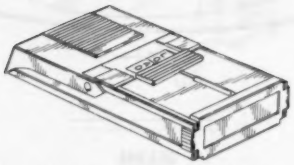
253,056
DEEP PLACEMENT FERTILIZER APPLICATOR
Larry J. Stone, Rte. 1, and Chester L. Wiles, Box 125, both of Vail, Iowa 51465
Filed Oct. 31, 1977, Ser. No. 846,862
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—13



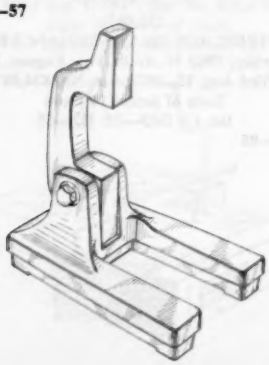
253,057
COTTON PICKER
Robert M. Fachini; Monroe C. Barrett, and Jimmie L. Scallions, all of Memphis, Tenn., assignors to International Harvester Company, Chicago, Ill.
Filed Nov. 21, 1977, Ser. No. 853,351
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—26



253,058
SLIDE VIEWER
Joseph Antos, Rte. 1, Box 18A, Big Rock, Ill. 60511
Filed Dec. 1, 1977, Ser. No. 856,293
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—14

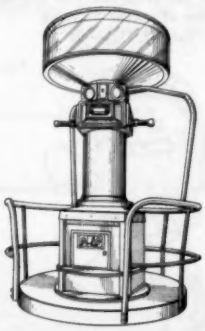


253,059
MICROSCOPE STAND
Edwin A. Speaker, 228 East Ave., Brockport, N.Y. 14420
Filed Jun. 24, 1977, Ser. No. 809,580
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—57

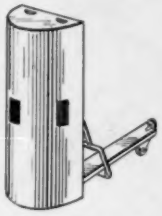


253,060
BALL POINT PEN OR SIMILAR ARTICLE
Kunio Itoh, Tokyo, Japan, assignor to Pentel Kabushiki Kaisha, Japan
Filed Jan. 6, 1978, Ser. No. 867,630
Claims priority, application Japan, Jul. 13, 1977, 52-27680
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—48

253,061
SUBMARINE AMUSEMENT GAME CABINET
Phillip C. Kearney, Aptos, Calif., assignor to Atari, Inc., Sunnyvale, Calif.
Filed Jan. 16, 1978, Ser. No. 869,869
Term of patent 14 years
Int. Cl. D21—*03*
U.S. Cl. D21—01



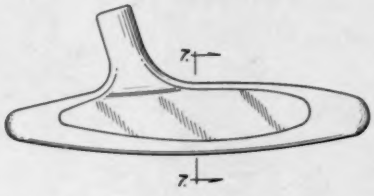
253,062
SCOOTER
Rudolph J. Kupka, 9101 Sheridan Ave., Brookfield, Ill. 60513
Filed Jun. 3, 1977, Ser. No. 809,014
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—81



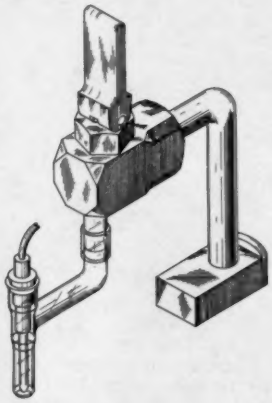
253,063
TOY BLOOD PRESSURE TESTER
W. Porter Clanton, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Feb. 6, 1978, Ser. No. 875,606
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—109

253,064
TOY DOLL
Richard W. M. Kimbrough, New York, and Gloria Caranica, Orchard Park, both of N.Y., assignors to The Quaker Oats Company, Chicago, Ill.
Filed Feb. 23, 1978, Ser. No. 880,859
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—184

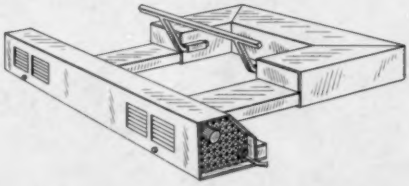
253,065
PUTTER HEAD
Richard C. Bennett, 7333 Armitage Ave., Elmwood Park, Ill. 60635
Filed Jun. 13, 1977, Ser. No. 806,089
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D21—217



253,066
FAUCET FOR PROTECTING STERILE FLUID SYSTEMS
Narbik A. Karamian, 7609 Exeter Rd., Bethesda, Md. 20014
Filed Oct. 17, 1978, Ser. No. 952,154
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—3



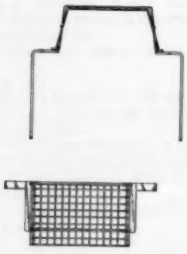
253,067
FIREPLACE HEAT EXCHANGER
Ronald C. Hartley, 1963 W. Sixth Ave., Eugene, Oreg. 97402
Filed Aug. 15, 1977, Ser. No. 824,567
Term of patent 14 years
Int. Cl. D23—*03;* D7—*08*
U.S. Cl. D23—95



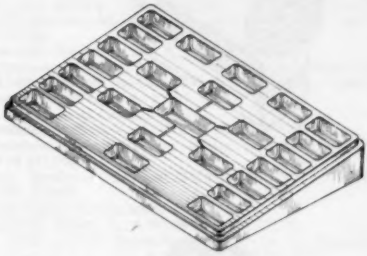
253,068
STOVE
Richard F. Ross, 103 Washington St., Mendon, Mass. 01756
Filed Nov. 7, 1977, Ser. No. 849,010
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97

253,069
HAND HELD SHOWERHEAD
Kenneth A. Ogilvie, Naunton, England, assignor to Walker Corsweller & Company Limited, Cheltenham, England
Filed Jan. 9, 1978, Ser. No. 868,191
Claims priority, application United Kingdom, Jul. 9, 1977, 980705/77
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—35

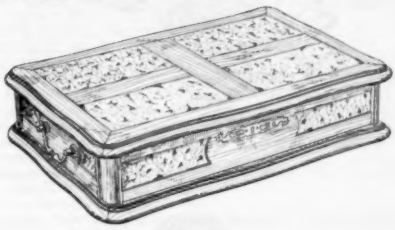
253,070
PATIENT'S HEAD PROTECTOR FOR OPERATING TABLES
John B. Gilleran, 4940 NW. 31 St., Oklahoma City, Okla. 73122
Filed Sep. 6, 1977, Ser. No. 830,479
Term of patent 14 years
Int. Cl. D24—*01;* D6—*01*
U.S. Cl. D24—7



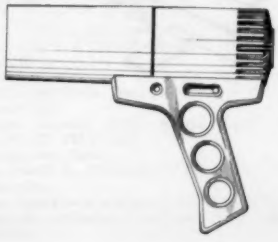
253,071
DENTAL CERAMIC STAIN TRAY
Donald Montez, 2804 Eastridge Cir., Modesto, Calif. 95355
Filed Jun. 6, 1977, Ser. No. 804,105
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—10



253,072
CIGAR BOX
Georges Blanc, Vonnas (Ain), France
Filed Jan. 17, 1978, Ser. No. 870,263
Claims priority, application France, Aug. 9, 1977, 77 395
Term of patent 14 years
Int. Cl. D27—*06*
U.S. Cl. D27—43

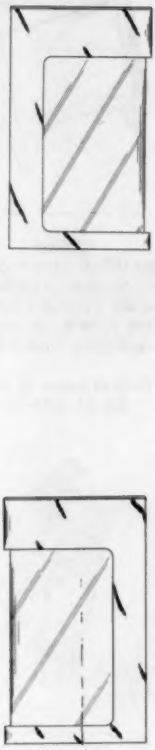


253,073
ELECTRIC PISTON HAIR DRYER OR SIMILAR ARTICLE
Walter C. Anderson, West Redding, Conn., assignor to General Electric Company
Filed Dec. 19, 1977, Ser. No. 861,662
Term of patent 3½ years
Int. Cl. D28—*03*
U.S. Cl. D28—13



253,074
DRYER
John Wistrand, New Canaan, Conn., assignor to Clairol Incorporated
Filed Nov. 14, 1977, Ser. No. 851,083
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—16

253,075
AQUARIUM
Arthur B. Renny, 1329 Beaconsfield, Grosse Pointe Park, Mich. 48084
Filed Feb. 17, 1978, Ser. No. 878,933
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—6



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TO WHOM

PATENTS WERE ISSUED ON THE 2ND DAY OF OCTOBER, 1979

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Eriksson, Ronny, 4,169,715, Cl. 55-161.000.
Jacobsson, Jan R., 4,169,655, Cl. 350-1.700.

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Miyazawa, Takeo; Horiuchi, Yukio; Akita, Eiichi; Umezawa, Hamao; and Umezawa, Sumio, 4,169,890, Cl. 424-180.000.

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Bedard, Kenneth L., 4,169,657, Cl. 350-96.230.
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Lang, Stanley A., Jr.; and Walworth, Bryant L., 4,169,838, Cl. 548-262.000.

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Cavigelli, George A., 4,169,996, Cl. 330-99.000.

Ames, Adolf, to Swiss Aluminium Ltd. Device for extruding hollow and semi-hollow sections. 4,169,366, Cl. 72-269.000.

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Moist, Stanford C., Jr., 4,169,648, Cl. 339-103.00R.
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Amstad, John H., to Atlas Pacific Engineering Company. Apple orienting system. 4,169,528, Cl. 198-385.000.

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Hansen, Borge M.; Andersen, Per; Hoppmann, Uwe W.; and Bebe, Hans J., 4,169,358, Cl. 62-154.000.

Anderson, Harold F., deceased: *See*—
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Stelmasik, Gregory A.; and Anderson, Richard T., 4,169,412, Cl. 100-257.000.

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Lehmann, Karl-Heinz; and Artzt, Peter, 4,169,564, Cl. 242-157.00R.
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Teitelbaum, Bernard R.; and Carrico, John P., 4,169,388, Cl. 73-714.000.
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Bennett, Lewis L. Leveling device. 4,169,320, Cl. 33-367.000.
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Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.
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Beschke, Helmut; and Friedrich, Heinz, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the production of substituted pyridine (B). 4,169,951, Cl. 546-250.000.
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Black, Lawrence M., to United States of America, Navy. Stripline patch antenna. 4,170,013, Cl. 343-700.0MS.
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Blackstone, Eugene G.; Lofy, Richard A.; and Williams, Lawrence P., to Babcock & Wilcox Company, The. Nuclear reactor vessel inspection apparatus. 4,169,758, Cl. 176-19.00R.
Blanchet, Andre F., to Satam Industries. Mixing and distributing apparatus for gasoline and oil. 4,169,544, Cl. 222-134.000.
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Block, Merrill. Two-phase transformer and welding circuit therefor. 4,169,975, Cl. 219-116.000.
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Blom, Nico, to U.S. Philips Corporation. Control device for a matrix printer. 4,169,684, Cl. 400-124.000.
Blount, David H. Process for the production of amino silicate compounds and their condensation products. 4,169,930, Cl. 528-38.000.
Blumbergs, John H.; Finley, Joseph H.; and Baum, Burton M., to FMC Corporation. Sulfonic anhydrides as peroxygen activators. 4,169,805, Cl. 252-95.000.
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Boberski, William G.; Seiner, Jerome A.; and Blasko, John E., to PPG Industries, Inc. Curable compositions comprising aqueous solutions of water-soluble silicates and water-soluble borate latent insolubilizers. 4,169,735, Cl. 106-84.000.
Bock, Jan; Lundberg, Robert D.; and Makowski, Henry S., to Exxon Research & Engineering Co. Elastomeric compositions. 4,169,820, Cl. 260-23.50A.
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Bokros, Jack C., to CarboMedics, Inc. Anastomatic couplings. 4,169,477, Cl. 128-334.00R.
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Bone, Miroslav B. Precision electrical calipers. 4,169,317, Cl. 33-148.00H.
Bonhomme, Francois R. Electrical connection devices. 4,169,644, Cl. 339-75.0MP.
Bonigut, Josef; Lindberg, Ramon E.; and Darm, Peter K. Automatic pool cleaner apparatus. 4,169,484, Cl. 134-167.00R.
Bonn, Thomas S. Hydraulic jet drill stem and bit unplugging device. 4,169,483, Cl. 134-94.000.
Bopp, Warren G., to Eaton Corporation. Friction fan clutch. 4,169,527, Cl. 192-82.00T.
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Boudouris, Angelo; Petty, William D.; and Simonds, Clarence S., to Eprad Incorporated. Film supply and take-up system for motion picture projector. 4,169,566, Cl. 242-55.180.
Bouvier, Claude J.; Smithson, David J.; and Luais, Jean-Paul, to Compagnie Honeywell Bull. Apparatus for selective control of information between close and remote stations. 4,170,038, Cl. 364-200.000.
Boyce, James R.; and Farber, Erich A. Solar energy collection and utilization system. 4,169,712, Cl. 48-197.00A.
Boyd, Violet; Fishwick, Brian R.; Glover, Brian; Korn, Stewart R.; and Bostock, Susan M., to Imperial Chemical Industries Limited. Coloration process. 4,169,705, Cl. 8-41.00C.
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Brakebill, Harold G., to Robertshaw Controls Company. Method of operating a control system. 4,169,485, Cl. 137-14.000.
Braver, Alvin S., to International Environmental Mfg. Co. Modular air conditioning apparatus. 4,169,500, Cl. 165-50.000.
Breslow, Jeffrey D.; Kuna, Wayne A.; and Jaworski, Eugene, to Marvin Glass & Associates. Rolling toys. 4,169,334, Cl. 46-103.000.
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Brock, Horace T., Jr. Cylinder de-activator system. 4,169,449, Cl. 123-198.00F.
Brois, Stanley J.: *See*—
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Brower, Boyd G., to GTE Sylvania Incorporated. Multilamp photoflash unit with more reliable circuit arrangement. 4,170,034, Cl. 362-12.000.
Brown, Donald J., to Knox Manufacturing Co. Picture screen. 4,169,658, Cl. 350-118.000.
Brown, Jasper H.; Morgan, Albert W.; and Wang, Donald S. T., to Monsanto Company. Rigid polyurethane foam-forming compositions. 4,169,922, Cl. 521-155.000.
Brown, Philip A. Boom-pulpit vehicle. 4,169,511, Cl. 180-212.000.
Brown, Ralph V., to Facet Enterprises, Inc. High pressure fluid pump. 4,169,696, Cl. 417-417.000.
Brubaker, Richard K., to Eaton Corporation. Fluid coupling device and fan mounting arrangement. 4,169,693, Cl. 416-93.00R.
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Budliger, Jean-Pierre; and Arieh, Simon, to Battelle Development Corporation. Apparatus for continuously measuring the flow rate of each of the components of a composite fluid flow formed of a liquid and of a gas. 4,169,374, Cl. 73-194.00E.
Buechner, Oskar; and Gierth, Volker, to BASF Aktiengesellschaft. Manufacture of low density ethylene polymers of improved homogeneity. 4,169,929, Cl. 526-352.200.
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Burgess, Roland A., to Union Camp Corporation. Fertilizer distributor. 4,169,419, Cl. 111-2.000.
Burke, Oliver W., Jr., deceased (by Scala, Norma, administratrix); and Humphreys, Victor T., to Marion Darrah and Joseph Y. Houghton, Co-Trustees. Intrachromospheruloid/intraleuco-spheruloid pigment compositions and processes for producing same. 4,169,737, Cl. 106-308.00M.
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Cain, Selwyn H. Box construction with strengthened lid closure. 4,169,553, Cl. 229-43.000.
Calderaro, Dante R. Foldable bearer structure for outer moulds. 4,169,576, Cl. 249-188.000.
Calvert, Seymour, to A.P.T., Inc. Removal of fine particles from a gas stream by solid particle addition in venturi contactor. 4,169,714, Cl. 55-5.000.
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Camp, Eldon D. Solar energy system with heat pump assistance. 4,169,554, Cl. 126-427.000.
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Castrodale, Daniel O.; and Fournier, Thomas R., to International Business Machines Corporation. Drive machine moving magnetic disks only partially therein for data transfer. 4,170,030, Cl. 360-98.000.
Cataldo, Roy S., to General Motors Corporation. Run-flat tire and wheel arrangement with inverted bead interlock. 4,169,496, Cl. 152-379.100.
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Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Jefferson, Mark T.; Huang, Liang H.; Shibakawa, Riichiro; and Tone, Junsuke, to Pfizer Inc. Antibiotics produced by species of actinoplanes. 4,169,887, Cl. 424-119.000.
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Chachin, Viktor N.; Sakulevich, Faddei J.; Olender, Leonty A.; Serdyaev, Grigory K.; Kosobutsky, Alexandr A.; Murkov, Oleg S.; and Sobolevsky, Vitaly P. Machine for three-dimensional polishing of workpieces shaped as solids of revolution in a magnetic field using ferromagnetic abrasive powders. 4,169,713, Cl. 51-7.000.
Chang, Shih-Chia, to General Motors Corporation. Method and thin film semiconductor sensor for detecting NO_x. 4,169,369, Cl. 73-23.000.
Chanso Corporation: *See*—
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Cheetham, Harry A. Modular heat exchangers with a common flue. 4,169,430, Cl. 122-25.000.
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Jensen, Harbo P., 4,169,710, Cl. 44-1.0SR.
Miller, Stephen J., 4,169,781, Cl. 208-97.000.
Wall, Robert G.; Wilkes, John B.; and Suzuki, Shigeto, 4,169,961, Cl. 568-857.000.
Childs, William V., to Phillips Petroleum Company. Removing water from fluorinated alcohols employing a tetrahydrocarbylammonium hydroxide. 4,169,960, Cl. 568-842.000.
Chinenson, Benjamin. Board game including throwable playing pieces. 4,169,596, Cl. 273-95.00R.
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Cirri, Gian Franco, to Valfivre S.p.A. Process for cutting or shaping of a substrate by laser. 4,169,976, Cl. 219-121.0LM.
Claassen, George R.; and Mickelic, Raymond J., to PPG Industries, Inc. Tong for supporting glass sheets having their edges welded together. 4,169,622, Cl. 294-118.000.
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Clark, Frank B., to United States of America, Navy. Method of making a hollow airfoil. 4,169,749, Cl. 156-156.000.
Clark, Samuel K.; and Lourenco, Manuel J., to United States of America, Transportation. Tire bead inspection. 4,169,373, Cl. 73-146.000.
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Clitherow, John W.: *See*—
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Clough, Thomas J., to Atlantic Richfield Company. Process, products and composition. 4,169,859, Cl. 260-593.00R.
Coates, Robert N., to CAM Industries Inc. Water distribution chamber for an electric steam generator. 4,169,558, Cl. 239-553.500.
Coates, William J. Message delivery device. 4,169,582, Cl. 258-9.000.
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Bouvier, Claude J.; Smithson, David J.; and Luais, Jean-Paul, 4,170,038, Cl. 364-200.000.
Comte, Philippe: *See*—
Precausta, Pierre; Bugand, Marc; Comte, Philippe; and Zwingelstein, Georges, 4,169,761, Cl. 435-235.000.
Conciatori, Anthony B.: *See*—
DeGuia, Andrea A.; Stackman, Robert W.; and Conciatori, Anthony B., 4,169,945, Cl. 536-114.000.
Continental Oil Company: *See*—
McCain, David L.; and Umphrey, Ronald W., 4,169,631, Cl. 406-40.000.
Contract Systems Associates, Inc.: *See*—
Parisi, Tulio, 4,169,984, Cl. 310-323.000.
Cooke, William E.; and Hodgson, John, to Alcan Research and Development Limited. Electroplating aluminum articles. 4,169,770, Cl. 204-28.000.
Cordis Corporation: *See*—
Obrez, Ivo, 4,169,464, Cl. 128-657.000.
Cornish, William G.: *See*—
Crump, Desmond G.; Cornish, William G.; and Same, Hyem G., 4,169,427, Cl. 118-307.000.
Coronet-Werke Heinrich Schlerf GmbH: *See*—
Weihrauch, Georg, 4,169,297, Cl. 15-145.000.
Cortes, Antonio C., to Proptis, S.A. Apparatus for the preparation of eyeglass lenses, prior to the shaping and/or bevelling thereof. 4,169,318, Cl. 33-174.00A.
Cottrell, Henry L.; and Faith, Wesley A., to VFE Corp. Method and a system for incinerating combustible wastes. 4,169,418, Cl. 110-346.000.
CPG Products Corporation: *See*—
Kuhn, James O., 4,169,336, Cl. 46-156.000.
Cramer, Frank B., to Clean Energy Corporation. Apparatus for reducing ore. 4,169,583, Cl. 266-122.000.
Crane, John C., to Mettoy Company Limited, The. Hollow articles. 4,169,594, Cl. 273-58.0BA.
Crepeau, Robert G.: *See*—
Schultz, Phillip E.; and Crepeau, Robert G., 4,169,390, Cl. 74-2.000.
Crestworth Limited: *See*—
Walker, Edward C., 4,170,035, Cl. 362-31.000.
Creutz, Hans-Gerhard, deceased (by Creutz, Katharina A., administratrix); Herr, Roy W.; and Martin, Sylvia, to Oxy Metal Industries Corporation. Ductile bright zinc electroplating bath and process and additive therefor. 4,169,771, Cl. 204-55.00R.
Creutz, Katharina A., administratrix: *See*—
Creutz, Hans-Gerhard, deceased; Herr, Roy W.; and Martin, Sylvia, 4,169,771, Cl. 204-55.00R.
Cricchio, Renato, to Gruppo Lepetit S.p.A. Rifamycin derivatives. 4,169,834, Cl. 260-239.30P.
Crocker, Timothy R. Rotational machine. 4,169,433, Cl. 123-46.00R.
Cronin, Edward F., to General Electric Company. Integrally cooled electrical feedthrough bushing. 4,169,965, Cl. 174-15.0BH.
Crowe, Gearld E., to United Technologies Corporation. Extendible exit cone. 4,169,555, Cl. 239-265.330.
Crump, Desmond G.; Cornish, William G.; and Same, Hyem G. Cable cleaning unit. 4,169,427, Cl. 118-307.000.
Cuer, Jean-Pierre; Floreancig, Antoine; and Wojcik, Jean, to Produits Chimiques Ugine Kuhlmann. Method of treating nitric effluents. 4,169,880, Cl. 423-166.000.
Cullen, Walter P.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Jefferson, Mark T.; Huang, Liang H.; Shibakawa, Riichiro; and Tone, Junsuke, 4,169,887, Cl. 424-119.000.
Culler, Jimmie G., to PhotoSystems. Variable volume container for processing photographic materials. 4,169,671, Cl. 354-312.000.
Cummins Engine Company, Inc.: *See*—
Woollenweber, William E., 4,169,354, Cl. 60-600.000.
Curtze, Jurgen: *See*—
Schacht, Erich; Lauterbach, Gunter; Mehrhof, Werner; Curtze, Jurgen; Linden, Gerbert; Lust, Siegmund; and Thomas, Klaus, 4,169,720, Cl. 71-108.000.
CVG-Siderurgica Del Orinoco, C.A.: *See*—
Rubio, Charles A., 4,169,533, Cl. 209-11.000.
Czornyj, George; Swalen, Jerome D.; and Wu, Anthony W., to International Business Machines Corporation. Preparation of polymer monomolecular films. 4,169,904, Cl. 427-44.000.
D.A.B. Industries, Inc.: *See*—
Malinowski, Eugene F.; and Klimkowski, Casimir, 4,169,523, Cl. 188-71.400.
Dahlin, Clarence W. Processing of dicalcium phosphate and sodium montmorillonite. 4,169,796, Cl. 252-1.000.
Dai-Ichi Seiko Co., Ltd.: *See*—
Bandoh, Kazuo, 4,169,299, Cl. 15-312.00R.
Dai Nippon Printing Co. Ltd: *See*—
Noshiro, Atsumi; Obata, Hiroyuki; Takamizawa, Minoru; and Inoue, Yoshio, 4,169,731, Cl. 96-1.00R.
Daidoseiko Kabushikikaisha: *See*—
Hiratake, Susumu; and Matsui, Mitsuhiro, 4,169,962, Cl. 13-2.00P.
Dale, Glenn H.: *See*—
Nielsen, Richard H.; and Dale, Glenn H., 4,169,784, Cl. 208-113.000.
Dallemagne, Robert: *See*—
Bessard, Jacques; Dallemagne, Robert; and Hannigsberg, Claude, 4,169,969, Cl. 179-84.0VF.
Damratroski, Harold E.; and Morton, Ray H., to Traid Fastener Corporation. Irrigation pipe gate. 4,169,577, Cl. 251-145.000.
Dana Corporation: *See*—
Guenther, William D., 4,169,434, Cl. 123-47.00A.
Danfoss A/S: *See*—
Hansen, Borge M.; Andersen, Per; Hoppmann, Uwe W.; and Bebe, Hans J., 4,169,358, Cl. 62-154.000.
Daniel, Thell D.: *See*—
De Rooy, Felix J.; Daniel, Thell D.; Annes, Erle C.; and Arnold, Billy G., 4,169,747, Cl. 156-39.000.
Danielsson, Per-Erik; Kruse, Carl A. B.; and Paabo, Michael A. X. Device for examination of distances in a picture. 4,170,003, Cl. 340-146.3MA.
Darling, Michael E. Mattress structure. 4,169,295, Cl. 5-450.000.
Darm, Peter K.: *See*—
Bonigut, Josef; Lindberg, Ramon E.; and Darm, Peter K., 4,169,484, Cl. 134-167.00R.
Data Recording Instrument Company Limited: *See*—
Ridgway, Peter C.; and Case, Derek F., 4,170,033, Cl. 360-121.000.
Dathe, Wolfgang: *See*—
Werner, Gerhard; Tietz, Hans-Jurgen; Wagner, Reinhard; and Dathe, Wolfgang, 4,169,821, Cl. 260-27.0BB.
Davis, Donald C.: *See*—
Young, Ching T.; Romine, Donald J.; Woodruff, Phillip R.; Davis, Donald C.; Bode, James D.; and Tien, Tseng Y., 4,169,777, Cl. 204-195.00S.
Davis, Jerry E.; Mueller, Frank J.; and Novosel, Gerald W., to Procter & Gamble Company, The. Agglomeration process for making granular detergents. 4,169,806, Cl. 252-99.000.
Dayco Corporation: *See*—
Wetzel, Robert E.; Miranti, Joseph P., Jr.; and Hall, Donald D., 4,169,393, Cl. 74-233.000.
Dean, David B.: *See*—
Eddleman, William L., 4,169,776, Cl. 204-118.000.
DeBenedictis, Leonard C.; and Johnson, Richard V., to Xerox Corporation. Facet tracking in laser scanning. 4,170,028, Cl. 358-285.000.
Debrus, Andre: *See*—
Plan, Robert; Liautaud, Jacques; Makula, Marie-France; Gattel, Paule; Pla, Jean; and Debrus, Andre, 4,169,829, Cl. 260-122.000.
Decker, Herman W., to Ransburg Corporation. Plural component dispensing apparatus. 4,169,545, Cl. 222-136.000.
Degischer, Gerhard; Angst, Werner; and Valloton, Mario, to Saurefabrik Schweizerhall. Process for the manufacture of α-chloroalkanoyl chlorides. 4,169,847, Cl. 260-544.00Y.
DeGuia, Andrea A.; Stackman, Robert W.; and Conciatori, Anthony B., to Celanese Corporation. Process for production of polygalactomannan ethers. 4,169,945, Cl. 536-114.000.
Deigner, Paul: *See*—
Schonafinger, Eduard; Deigner, Paul; Ohlinger, Manfred; Jakusch, Helmut; Amort, Jurgen; Nestler, Heinz; Seiler, Claus-Dietrich; and Ambros, Otto, 4,169,912, Cl. 428-145.000.
Delaval, Jean-Claude; and Stagnetto, Joseph, to Rhone-Poulenc Industries. Process for lubricating textile threads. 4,169,905, Cl. 427-177.000.
DeLeon, Alberto: *See*—
Moss, Ernest K.; DeLeon, Alberto; and Skowronski, Michael J., 4,169,921, Cl. 521-125.000.
De Long, Charles F., to United States Trading International, Inc. Method of repelling animals and birds. 4,169,902, Cl. 427-4.000.
DeLuca, John P.: *See*—
Murrell, Lawrence L.; Grenoble, Dane C.; and DeLuca, John P., 4,169,883, Cl. 423-628.000.
DeMartino, Ronald N., to Celanese Corporation. Well-treating compositions. 4,169,798, Cl. 252-8.55R.
DeMartino, Ronald N., to Celanese Corporation. Mixture of hydroxypropylcellulose and poly(maleic anhydride/alkyl vinyl ether) as a hydrocolloid gelling agent. 4,169,818, Cl. 260-17.00R.
Deming, Kenneth R.: *See*—
Mann, Gamdur S.; Murphy, Michael P.; Fredericks, David R.; and Deming, Kenneth R., 4,169,778, Cl. 204-195.00S.
Dennis, Ronald E., to Caterpillar Tractor Co. Workpiece holder. 4,169,585, Cl. 269-48.100.

De Rooy, Felix J.; Daniel, Thell D.; Annes, Erle C.; and Arnold, Billy G., to United States Gypsum Company. Composition for accelerating the setting of calcined gypsum and the product formed thereby. 4,169,747, Cl. 156-39.000.

Descoins, Daniel; Portes, Alain; and Lafon, Pierre, to Societe Chimique des Charbonnages. Reactor suitable for chemical reactions bringing fluids into action in contact with a bed of solids. 4,169,879, Cl. 422-220.000.

Dettmers, Michael: *See—*
Weirich, Walter; Dettmers, Michael; Rassmann, Christoph; Heyer, Willi; Beyer, Herbert; and Linke, Horst, 4,169,689, Cl. 405-291.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Beschke, Helmut; and Friedrich, Heinz, 4,169,951, Cl. 546-250.000.

Dharia, Dilip J.: *See—*
Baker, Bernard S.; and Dharia, Dilip J., 4,169,917, Cl. 429-26.000.

Dickason, William C.: *See—*
Pond, David M.; Dickason, William C.; and Elam, Edward U., 4,169,837, Cl. 548-224.000.

Dickinson, William A.: *See—*
Amstutz, O. Wendell; Dickinson, William A.; and Kreidler, James F., 4,170,027, Cl. 358-246.000.

Diesel Equipment Ltd.: *See—*
Furzer, Roy G. R., 4,169,447, Cl. 123-179.00E.

Diesel Kiki Company, Ltd.: *See—*
Kaibara, Nobuhiro; Yuzawa, Yasutaka; and Kobayashi, Masayoshi, 4,169,444, Cl. 123-139.0AQ.

Dietrich, Hagen: *See—*
Potter, Dennis G.; Dietrich, Hagen; and Potschka, Joseph, 4,169,618, Cl. 292-169.150.

Digby, Dennis; and Keller, John W., Jr., to Biotronik Mess- und Therapiegerate GmbH & Co. Demand pacer with programmable rate hysteresis. 4,169,480, Cl. 128-419.0PG.

DiMarchi, Silvio J.; Goldman, Marvin A.; Gilmore, Arthur; and Goldman, Jerome N., to Penn-Plax Plastics, Inc. Aquarium thermometer. 4,169,378, Cl. 73-353.000.

DiMarchi, Silvio J.: *See—*
Goldman, Marvin A.; Goldman, Jerome N.; Gilmore, Arthur; and DiMarchi, Silvio J., 4,169,382, Cl. 73-376.000.

Dischert, Robert A., to RCA Corporation. Television control system. 4,170,024, Cl. 358-41.000.

Dr. Johannes Heidenhain GmbH: *See—*
Ernst, Alfons, 4,169,316, Cl. 33-125.00C.

Doi, Yoshihiko: *See—*
Kobayashi, Mitsunori; Doi, Yoshihiko; Tobioka, Masaaki; and Yamamoto, Takaharu, 4,169,913, Cl. 428-217.000.

Dolak, Lester A., to Upjohn Company, The. Chemical oxidation of novobiocin and products obtained therefrom. 4,169,940, Cl. 536-13.000.

Domke, Robert A.: *See—*
Knowles, Robert G.; and Domke, Robert A., 4,169,647, Cl. 339-99.00R.

Donovan, Marion. Garment hanger. 4,169,534, Cl. 211-113.000.

Dorpmund, Willi, to Graaff Kommanditgesellschaft. Side wall construction for a container for shipping goods. 4,169,407, Cl. 98-32.000.

Douglas, Ormond S. Exercise device for invalids. 4,169,591, Cl. 272-144.000.

Dounchis, Harry, to FMC Corporation. Turbine lubricant. 4,169,800, Cl. 252-49.900.

Doundoulakis, George J. Angular compression expansion cylinder with radial pistons. 4,169,697, Cl. 418-34.000.

Douwenga, Rudolf, to Lockwood International B.V. Device for opening out the filling apertures of bags. 4,169,345, Cl. 53-570.000.

Dovel, William L. Water intake device. 4,169,792, Cl. 210-82.000.

Dow Chemical Company, The: *See—*
Dunbar, Joseph E.; and Begin, Louis E., 4,169,948, Cl. 544-118.000.

Doyer, Anthony E. J.: *See—*
Blok, Pieter; Elenbaas, Cornelis M.; and Doyer, Anthony E. J., 4,169,565, Cl. 242-18.00R.

Drehman, Lewis E., to Phillips Petroleum Company. Catalyst for dehydrogenation process. 4,169,815, Cl. 252-466.0PT.

Drew, Gene R.; Gylseth, Herman M.; Van Buskirk, William O.; and Newkirk, Richard V., to United States of America, Navy. Hermetically sealed parachute container. 4,169,568, Cl. 244-148.000.

Drewes, Harold R., to Du Pont de Nemours, E. I., and Company. Process for the preparation of cyclohexanone-2-carboxamide. 4,169,952, Cl. 548-359.000.

Drosd, Ralph D., deceased: *See—*
Taylor, Richard L.; Drosd, Ralph D., deceased; and Gregory, Luther W., administrator, 4,169,993, Cl. 325-470.000.

D'Silva, Themistocles D. J., to Union Carbide Corporation. Pesticidal unsymmetrical N-substituted bis-carbamoyloxy disulfide compounds. 4,169,894, Cl. 424-277.000.

D'Silva, Thomas L., to Western Gold and Platinum Company. Nickel-chromium-silicon alloy brazing foil. 4,169,744, Cl. 148-32.000.

Du Bois, Loring E.; and Simpson, Lawrence D., to Western Electric Company, Inc. Electronic article with orientation-identifying surface shape. 4,170,021, Cl. 357-55.000.

Ducret, Lucien C. Cable armor cutting machine. 4,169,400, Cl. 83-409.000.

Dufour, Raymond J.: *See—*
Weil, Sanford A.; Rush, William F.; Wurm, Jaroslav; and Dufour, Raymond J., 4,169,362, Cl. 62-478.000.

Duggan, William G. Hose cradles. 4,169,571, Cl. 248-49.000.

Duke, Norman G. Switch operated alarm circuit. 4,170,005, Cl. 340-547.000.

Dunbar, Joseph E.; and Begin, Louis E., to Dow Chemical Company, The. Pyrazolopyrimidines. 4,169,948, Cl. 544-118.000.

Du Pont de Nemours, E. I., and Company: *See—*
Drewes, Harold R., 4,169,952, Cl. 548-359.000.
Irwin, Robert S., 4,169,876, Cl. 264-206.000.
Levitt, George, 4,169,719, Cl. 71-92.000.
Mouissie, Bob, 4,169,642, Cl. 339-17.00F.
Simms, John A., 4,169,955, Cl. 560-159.000.

Dynamit Nobel Aktiengesellschaft: *See—*
Schonafinger, Eduard; Deigner, Paul; Ohlinger, Manfred; Jakusch, Helmut; Amort, Jurgen; Nestler, Heinz; Seiler, Claus-Dietrich; and Ambros, Otto, 4,169,912, Cl. 428-145.000.

E. R. Squibb & Sons, Inc.: *See—*
Gordon, Eric M., 4,169,946, Cl. 544-21.000.
Treuner, Uwe D.; and Breuer, Hermann, 4,169,947, Cl. 544-27.000.

Eason, Steven P., to ACF Industries, Inc. Staged carburetor. 4,169,871, Cl. 261-23.00A.

Eastern Fusecoat Incorporated: *See—*
Voitas, Edward J., 4,169,637, Cl. 308-241.000.

Eastern Tool & Machine, Inc.: *See—*
Szalay, Frank; and Kubik, Joseph C., 4,169,635, Cl. 308-136.000.

Eastman Kodak Company: *See—*
Jackson, Winston J., Jr.; and Morris, John C., 4,169,933, Cl. 528-190.000.
Pond, David M.; Dickason, William C.; and Elam, Edward U., 4,169,837, Cl. 548-224.000.
Russel, Matthew J., 4,169,674, Cl. 355-14.000.
Yen, Edward C., 4,169,751, Cl. 156-73.100.

Eaton Corporation: *See—*
Bopp, Warren G., 4,169,527, Cl. 192-82.00T.
Brubaker, Richard K., 4,169,693, Cl. 416-93.00R.

Eaton, James W.: *See—*
Clarke, John T.; Harker, Royce K.; Hittmeier, Michael E.; and Eaton, James W., 4,169,748, Cl. 156-62.200.

Eberly, Paul E., Jr., to Exxon Research & Engineering Co. Reforming with multimetallic catalysts. 4,169,785, Cl. 208-139.000.

EBY Company: *See—*
Schweizer, William E., 4,169,650, Cl. 339-198.00R.

Eddleman, William L., to Dean, David B.; and Hayden, Douglas B., Jr., part interest to each. Method for recovery of metallic zinc from chlorine contaminated skimmings. 4,169,776, Cl. 204-118.000.

Eden, Jamal S., to B. F. Goodrich Company, The. Low temperature catalytic combustion of chlorohydrocarbons. 4,169,862, Cl. 260-654.00A.

Ehrlich, Brent H. Solar converter. 4,169,459, Cl. 126-432.000.

Eik, Geir, to A/S NorMar. Telescopic boom. 4,169,338, Cl. 52-118.000.

Elam, Edward U.: *See—*
Pond, David M.; Dickason, William C.; and Elam, Edward U., 4,169,837, Cl. 548-224.000.

Electric Power Research Institute, Inc.: *See—*
Sanday, Santiago C., 4,169,694, Cl. 416-219.00R.

Elektrostatische Spritz— und Beflockungsgesellschaft G.F. Vohringer GmbH: *See—*
Vohringer, Gerhard F., 4,169,560, Cl. 239-698.000.

Elenbaas, Cornelis M.: *See—*
Blok, Pieter; Elenbaas, Cornelis M.; and Doyer, Anthony E. J., 4,169,565, Cl. 242-18.00R.

Eli Lilly and Company: *See—*
Price, Jerry D., 4,169,539, Cl. 220-410.000.

Ellens, Gordon A., to U.S. Industries Inc. Seat belt assembly. 4,169,614, Cl. 280-801.000.

Elliano, Jack L.; and Levin, Michael M. Time clock device. 4,170,015, Cl. 346-76.0PH.

Emanuel, Peter R.: *See—*
Koeneman, Paul W.; and Emanuel, Peter R., 4,169,617, Cl. 292-149.000.

Emergency Medical Equipment Incorporated: *See—*
Williams, Paul K., 4,169,550, Cl. 224-211.000.

Ender, Hans G.: *See—*
Ender, Josef; and Ender, Hans G., 4,169,470, Cl. 128-92.0BC.

Ender, Josef; and Ender, Hans G. Surgical nail for use in setting bone fractures, and tool for emplacing same. 4,169,470, Cl. 128-92.0BC.

Endo, Tadakazu; Nomura, Susumu; Matsumoto, Masato; and Takahashi, Kojiro, to Shinano Kikaku Company Limited. Film winding device for slide projectors. 4,169,669, Cl. 353-95.000.

Energy Research Corporation: *See—*
Baker, Bernard S.; and Dharia, Dilip J., 4,169,917, Cl. 429-26.000.

Engel, Robert W. Means for producing multi-colored hobby craft designs. 4,169,323, Cl. 35-26.000.

Enoki, Shigenaga: *See—*
Ishikawa, Masaru; Katagiri, Nagatoshi; Enoki, Shigenaga; and Ohta, Kozo, 4,169,512, Cl. 180-205.000.

Entek Corporation: *See—*
Adams, Ladd M., 4,169,578, Cl. 251-149.900.

Eprad Incorporated: *See—*
Boudouris, Angelo; Petty, William D.; and Simonds, Clarence S., 4,169,566, Cl. 242-55.180.

Epstein, James, to GTE Laboratories Incorporated. Hermetically sealed electrochemical battery. 4,169,920, Cl. 429-154.000.

Equipment Company of America: *See—*
Thurmond, Elmer T., Jr., 4,169,313, Cl. 30-432.000.
Thurmond, Elmer T., Jr., 4,169,581, Cl. 254-45.000.

Erckel, Rudiger: *See—*
Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, 4,169,810, Cl. 252-301.240.

Eriksson, Ronny, to AGA Aktiebolag. Fractionating apparatus. 4,169,715, Cl. 55-161.000.

Ernst, Alfons, to Dr. Johannes Heidenhain GmbH. Vibration resistant measuring device. 4,169,316, Cl. 33-125.00C.

Ernsthausen, Roger E.; Fein, Michael E.; and Byrum, Bernard W., Jr., to Owens-Illinois, Inc. Gas discharge device. 4,169,985, Cl. 313-218.000.

Erokhov, Veniamin K.: *See—*
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.

Escomat Maschinenbau Schmitt & Co.: *See—*
Tanham, Horst, 4,169,406, Cl. 93-49.0AC.

Estrada, Jose L., to Phalanx Corporation. Anti-differential device. 4,169,394, Cl. 74-713.000.

Etablissements Francois Salomon et Fils: *See—*
Salomon, Georges P. J., 4,169,325, Cl. 36-117.000.

Etablissements Superba S.A.: *See—*
Gloeckler, Alfred M., 4,169,707, Cl. 8-149.300.

Etherington, Alfred B. Helical composter. 4,169,878, Cl. 422-184.000.

Euteco S.p.A.: *See—*
Cocuzza, Gioacchino; and Torreggiani, Gianni, 4,169,856, Cl. 260-585.00B.

Evenson, Dale D.; and Stair, Virgil H. Vegetation cutting apparatus. 4,169,311, Cl. 30-276.000.

Exxon Research & Engineering Co.: *See—*
Bardasz, Ewa A., 4,169,768, Cl. 204-1.00T.
Bock, Jan; Lundberg, Robert D.; and Makowski, Henry S., 4,169,820, Cl. 260-23.50A.
Eberly, Paul E., Jr., 4,169,785, Cl. 208-139.000.
Klemann, Lawrence P.; Newman, Gerald H.; and Stogryn, Eugene L., 4,169,808, Cl. 252-182.100.
Murrell, Lawrence L.; Grenoble, Dane C.; and DeLuca, John P., 4,169,883, Cl. 423-628.000.
Ryer, Jack; Zielinski, James; Miller, Harold N.; and Brois, Stanley J., 4,169,836, Cl. 548-238.000.
Tsien, Hsue C., 4,169,816, Cl. 252-511.000.

Ezaki, Norio: *See—*
Amano, Shoichi; Miyadoh, Shinji; Itoh, Mitsugu; Ezaki, Norio; Akita, Eiichi; and Yamada, Yujiro, 4,169,889, Cl. 424-122.000.

Facet Enterprises, Inc.: *See—*
Brown, Ralph V., 4,169,696, Cl. 417-417.000.

Facko, Gerhardt: *See—*
Reese, Robert H.; and Facko, Gerhardt, 4,169,326, Cl. 40-306.000.

Fahnestock, Melvin R.: *See—*
Tarosky, Jack; Fahnestock, Melvin R.; and Flowers, Leonard J., 4,169,586, Cl. 271-1.000.

Fairbanks, Norman P., to General Electric Company. Casting alloy and directionally solidified article. 4,169,726, Cl. 75-134.00F.

Faith, Wesley A.: *See—*
Cottrell, Henry L.; and Faith, Wesley A., 4,169,418, Cl. 110-346.000.

Fakhouri, Najib M., to Syntex (U.S.A.) Inc. Oxidative red hair dye. 4,169,703, Cl. 8-10.200.

Fakhouri, Najib M., to Syntex (U.S.A.) Inc. Oxidative blond hair dye. 4,169,704, Cl. 8-10.200.

Falk, Thomas, to United Technologies Corporation. Radar speed measurement from range determined by focus. 4,170,006, Cl. 343-5.0CM.

Farber, Erich A.: *See—*
Boyce, James R.; and Farber, Erich A., 4,169,712, Cl. 48-197.00A.

Faulconer, Edward L., Jr. Internal combustion engine and method. 4,169,435, Cl. 123-48.00A.

Faulconer, Harry A. Means and methods of joining conductors. 4,169,645, Cl. 339-98.000.

Fecht, Hans-Rudolf, to RCA Corporation. Raster distortion correction circuit. 4,169,988, Cl. 315-371.000.

Federal Signal Corporation: *See—*
Minogue, Robert W., 4,169,308, Cl. 29-407.000.

Fein, Michael E.: *See—*
Ernsthausen, Roger E.; Fein, Michael E.; and Byrum, Bernard W., Jr., 4,169,985, Cl. 313-218.000.

Felder, Donald W. Multi-rotor, direct current electric motor. 4,169,983, Cl. 310-46.000.

Fergg, Berthold; and Zahn, Wolfgang, to AGFA-Gevaert, A.G. Method and apparatus for photoelectrophoretic-color-process copying. 4,169,672, Cl. 355-3.00P.

Ferguson, Bruce A. Fabric covered button. 4,169,302, Cl. 24-113.00R.

Ferguson, Wilfred J., to Research Organics. Amino-hydroxy-alkyl sulfonic acid zwitterions. 4,169,950, Cl. 544-158.000.

Fernandes, Roberto, to Siderugica Italia S.A. Process of melting blast-furnace cast-iron. 4,169,723, Cl. 75-41.000.

Ferruti, Paolo; and Paoletti, Rodolfo. High polymers containing nicotinic acid, process for their preparation and their use. 4,169,923, Cl. 525-279.000.

Fiat-Allis Macchine Movimento Terra S.p.A.: *See—*
Portinaro, Santino, 4,170,004, Cl. 340-514.000.

Fiber Industries, Inc.: *See—*
Talbot, James R., 4,169,349, Cl. 57-289.000.

Finley, Joseph H.: *See—*
Blumbergs, John H.; Finley, Joseph H.; and Baum, Burton M., 4,169,805, Cl. 252-95.000.

Fischer, Artur. Crank assembly. 4,169,332, Cl. 46-17.000.

Fischer & Porter Company: *See—*
Herzl, Peter J., 4,169,376, Cl. 73-194.0VS.

Fish, Glenn E.: *See—*
Welch, Lewis W.; and Fish, Glenn E., 4,169,436, Cl. 123-58.0BC.

Fisher-Haynes Corp. of Georgia: *See—*
Haynes, Joseph R.; Wainwright, William F.; and Morris, Frank D., 4,169,416, Cl. 108-26.000.

Fishwick, Brian R.: *See—*
Boyd, Violet; Fishwick, Brian R.; Glover, Brian; Korn, Stewart R.; and Bostock, Susan M., 4,169,705, Cl. 8-41.00C.

Flair, Henry J., to Illinois Tool Works Inc. Machine for tracing the profile of an orbiting star gear. 4,169,691, Cl. 409-10.000.

Flanner, Philip D.; and Malcom, George G., to Systron-Donner Corporation. Linear accelerometer mechanism. 4,169,384, Cl. 73-516.00R.

Fleck, Fritz; Hervot, Emmanuel; Merk, Peter; Schmid, Horst; and Wiedemann, Achim, to Sandoz Ltd. Improved optical brightening of polyamides. 4,169,702, Cl. 8-1.00W.

Fleischer, Helmut, to Robert Bosch GmbH. Speed control system for a vehicle. 4,169,437, Cl. 123-102.000.

Fletcher, George W., to Atomic Energy Board. Aluminothermic process. 4,169,722, Cl. 75-10.00R.

Floreancig, Antoine: *See—*
Cuer, Jean-Pierre; Floreancig, Antoine; and Wojcik, Jean, 4,169,880, Cl. 423-166.000.

Flowers, Leonard J.: *See—*
Tarosky, Jack; Fahnestock, Melvin R.; and Flowers, Leonard J., 4,169,586, Cl. 271-1.000.

FMC Corporation: *See—*
Blumbergs, John H.; Finley, Joseph H.; and Baum, Burton M., 4,169,805, Cl. 252-95.000.
Dounchis, Harry, 4,169,800, Cl. 252-49.900.
Mencacci, Samuel A., 4,169,408, Cl. 99-355.000.
Smith, David W.; and Baadsgaard, Marinus J., 4,169,812, Cl. 252-415.000.

Fogle, Dale A.: *See—*
Goebel, Robert H.; and Fogle, Dale A., 4,170,008, Cl. 343-7.0PF.

Ford Motor Company: *See—*
Topouzian, Armenag, 4,169,919, Cl. 429-104.000.
White, Leslie G., 4,169,432, Cl. 123-41.860.

Fossum, Gust S. Carburetor de-icer. 4,169,442, Cl. 123-122.00A.

Foults, Jonathan A., deceased (by Foults, Patricia L., executrix), to Scovill Manufacturing Company. Apparatus for affixing slide fastener elements to fabric. 4,169,421, Cl. 112-104.000.

Foults, Patricia L., executrix: *See—*
Foults, Jonathan A., deceased, 4,169,421, Cl. 112-104.000.

Fournier, Thomas R.: *See—*
Beuch, Wallace E.; Larson, Curtis A.; Zell, Michael N.; and Fournier, Thomas R., 4,170,031, Cl. 360-98.000.
Castrodale, Daniel O.; and Fournier, Thomas R., 4,170,030, Cl. 360-98.000.

Frank, Pierre; and Sailer, Andre L., to Produits Chimiques Ugine Kuhlmann. Water-soluble tetrakisazo dyestuffs derived from 4,4'-diaminoazobenzene. 4,169,831, Cl. 260-159.000.

Fredericks, David R.: *See—*
Mann, Gamdur S.; Murphy, Michael P.; Fredericks, David R.; and Deming, Kenneth R., 4,169,778, Cl. 204-195.00S.

Freissmuth, Alfred; Gmoehling, Werner; Roeck, Heinrich; and Kniep, Peter, to SKW Trostberg Aktiengesellschaft. Desulfurization of iron melts. 4,169,724, Cl. 75-58.000.

Freitag, Dieter: *See—*
Schreckenberg, Manfred; Konig, Klaus; Freitag, Dieter; and Serini, Volker, 4,169,868, Cl. 525-439.000.

Frendreis, James A.: *See—*
Hayes, Robert A.; and Frendreis, James A., 4,169,422, Cl. 112-121.120.

Fresard, Marcel, to Mefina S.A. Pneumatic control device. 4,169,353, Cl. 60-592.000.

Frick, William G., Jr. Modular display sign system. 4,169,328, Cl. 40-612.000.

Frieberg, Murray, to Liberty Furniture Industries Limited. Joint assembly. 4,169,573, Cl. 248-188.000.

Friedrich, Heinz: *See—*
Beschke, Helmut; and Friedrich, Heinz, 4,169,951, Cl. 546-250.000.

Frielingsdorf, Hans: *See—*
Gruber, Wolfgang; Frielingsdorf, Hans; Bachl, Robert; and Schweier, Guenther, 4,169,925, Cl. 526-96.000.

Frischmann, Richard D.; and Spector, George. Sound bingo. 4,169,601, Cl. 273-269.000.

Fryatt, Leslie A., to J. H. Fenner & Co. Limited. Pulley assemblies. 4,169,530, Cl. 198-835.000.

Fuji Electric Co., Ltd.: *See—*
Yasuhara, Takeshi; Tamai, Mitsuru; and Yuhara, Tadanori, 4,169,389, Cl. 73-718.000.

Fuji Plastic Co.: *See—*
Tsunemoto, Shiro; Mizuguchi, Teruki; and Hirayama, Eiichi, 4,169,405, Cl. 92-13.600.

Fujii, Yuichi: *See—*
Yoshikawa, Yoshio; Nawata, Takanari; Goto, Mikio; and Fujii, Yuichi, 4,169,811, Cl. 252-408.000.

Fujikura, Yoshiaki: *See—*
Aigami, Koji; Inamoto, Yoshiaki; Ohsugi, Motoyoshi; Fujikura, Yoshiaki; and Takaishi, Naotake, 4,169,953, Cl. 560-117.000.

Fujimoto, Terunori: *See—*
Tsutsui, Nobuyuki; Omura, Hitoshi; Mizobe, Takashi; Kanda, Katsumi; and Fujimoto, Terunori, 4,169,916, Cl. 428-447.000.

Fujio, Ryota; Kitayama, Motozumi; Odaka, Fumio; Nyomura, Takashi; and Anzai, Shiro, to Bridgestone Tire Company Limited. Two-piece solid golf balls. 4,169,599, Cl. 273-220.000.

Fujiwara, Kunihisa: *See*—
Katayama, Toshio; Fujiwara, Kunihisa; and Jahami, Yoshimine, 4,169,701, Cl. 432-58.000.

Fukuda, Kenji: *See*—
Inoue, Masaru; Ishikawa, Makoto; and Fukuda, Kenji, 4,169,678, Cl. 356-321.000.

Funk, Friedrich, to Meyer AG Zuchwil. Shaft packing, in particular for use in colloid mill. 4,169,603, Cl. 277-59.000.

Furzer, Roy G. R., to Diesel Equipment Ltd. Starting system for compression ignition engine. 4,169,447, Cl. 123-179.00E.

GAF Corporation: *See*—
Barabas, Eugene S.; and Klein, Andrew, 4,169,924, Cl. 525-377.000.
Loofbourow, Donald I.; and Lach, Robert E., 4,169,667, Cl. 352-159.000.

Gal, George; and Pines, Seemon H., to Merck & Co., Inc. Process for preparing a ketone. 4,169,858, Cl. 260-590.00R.

Gale, John C.: *See*—
Slater, Dan; Gale, John C.; and Matza, Joseph L., 4,169,666, Cl. 352-85.000.

Gallacher, Lawrence V., to King Industries, Inc. Three-dimensional substrates coated with the reaction product of an amino resin and a high molecular weight sulfonic acid. 4,169,914, Cl. 428-290.000.

Gallagher, David A., to Bunker Ramo Corporation. Electrical connector mating clip. 4,169,643, Cl. 339-75.00P.

Gallinotti, Elio: *See*—
Basile, Giampiero; Gallinotti, Elio; and Boero, Giancarlo, 4,169,802, Cl. 252-62.510.

Ganz, James B.; Koval, Stephen; and Meenen, Raymond P., to Sagan Industries, Inc. Apparatus for fabricating cushioning and insulating material. 4,169,344, Cl. 53-546.000.

Gardner, Paul N., to Paul N. Gardner Company. Methods and apparatus for measuring the thickness of wet films. 4,169,319, Cl. 33-169.00F.

Garvey, Louis P.; Bobak, John G.; and Maye, Robert A., to General Motors Corporation. Vehicle seat mounting arrangement. 4,169,574, Cl. 248-429.000.

Garvey, Louis P.: *See*—
Wize, Gary A.; and Garvey, Louis P., 4,169,615, Cl. 280-801.000.

Gattel, Paule: *See*—
Plan, Robert; Liautaud, Jacques; Makula, Marie-France; Gattel, Paule; Pla, Jean; and Debrus, Andre, 4,169,829, Cl. 260-122.000.

Gebruder Loepfe AG: *See*—
Glockner, Rolf; Spani, Hans; and Stutz, Hansruedi, 4,169,399, Cl. 83-361.000.

Geil, Ronald J., to Gould Inc. Priming apparatus for liquid ink writing instruments. 4,170,016, Cl. 346-140.00R.

Gemvik, Ake O. V. Support foot device for load carriers. 4,169,417, Cl. 108-56.300.

General Electric Company: *See*—
Cronin, Edward F., 4,169,965, Cl. 174-15.0BH.
Fairbanks, Norman P., 4,169,726, Cl. 75-134.00F.
Hysell, Robert E.; and Piccone, Dante E., 4,170,019, Cl. 357-22.000.
Kruszona, Edward G., 4,169,305, Cl. 29-235.000.
Laska, Harry M.; and Grimm, Nelson, 4,169,875, Cl. 264-63.000.
Lee, Daeyong, 4,169,743, Cl. 148-32.000.
Lerdman, David M., 4,169,990, Cl. 318-138.000.
McDonough, Edward C.; and Tuley, Eugene N., 4,169,692, Cl. 415-115.000.
Moore, George E., 4,169,918, Cl. 429-57.000.
Wukusick, Carl S.; Tom, Thomas; and Buchakjian, Leo, Jr., 4,169,742, Cl. 148-32.500.

General Motors Corporation: *See*—
Barnett, Ronald R., 4,169,613, Cl. 280-732.000.
Cataldo, Roy S., 4,169,496, Cl. 152-379.100.
Chang, Shih-Chia, 4,169,369, Cl. 73-23.000.
Garvey, Louis P.; Bobak, John G.; and Maye, Robert A., 4,169,574, Cl. 248-429.000.
Hollar, Arthur W., Jr., 4,169,626, Cl. 297-365.000.
Hooper, Robert E., 4,169,636, Cl. 308-201.000.
Khuntia, Natabara; and Rader, Charles W., 4,169,524, Cl. 188-170.000.
Malloy, John D., 4,169,526, Cl. 192-3.300.
Mann, Gamdur S.; Murphy, Michael P.; Fredericks, David R.; and Deming, Kenneth R., 4,169,778, Cl. 204-195.00S.
Plyler, Robert G.; and Suverison, Lyle B., 4,169,654, Cl. 339-252.00P.
Wize, Gary A.; and Garvey, Louis P., 4,169,615, Cl. 280-801.000.

General Signal Corporation: *See*—
Bachle, Walter W., 4,169,967, Cl. 174-65.0SS.

Genese, Joseph N., to Abbott Laboratories. Additive transfer unit. 4,169,475, Cl. 128-272.300.

Gerlach, Klaus; and Lange, Wolfgang, to Akzona Incorporated. Flame resistant and self-extinguishing polymer compositions. 4,169,827, Cl. 260-45.75R.

Gerry, Martin E. Transient intermodulation ignition system. 4,169,445, Cl. 123-148.0AC.

Gewerkschaft Eisenhutte Westfalia: *See*—
Weirich, Walter; Dettmers, Michael; Rassmann, Christoph; Heyer, Willi; Beyer, Herbert; and Linke, Horst, 4,169,689, Cl. 405-291.000.

Gibbs, Don W. Sock and shoe and sock and shoe fastening means. 4,169,324, Cl. 36-83.000.

Gierth, Volker: *See*—
Buechner, Oskar; and Gierth, Volker, 4,169,929, Cl. 526-352.200.

Gilbert, Ronald E.; Lynch, Thomas J.; and Rowatt, Robert J., to Gulf Oil Corporation. Processes for dispersing inorganic additives in thermoplastic polymers. 4,169,826, Cl. 260-33.6PQ.

Gillette Company, The: *See*—
Miffitt, Donald C.; and Tortola, Angelo, 4,169,588, Cl. 272-70.000.

Gilmore, Arthur: *See*—
DiMarchi, Silvio J.; Goldman, Marvin A.; Gilmore, Arthur; and Goldman, Jerome N., 4,169,378, Cl. 73-353.000.
Goldman, Marvin A.; Goldman, Jerome N.; Gilmore, Arthur; and DiMarchi, Silvio J., 4,169,382, Cl. 73-376.000.

Glaxo Laboratories Limited: *See*—
Newell, Robert E., 4,169,547, Cl. 222-386.000.

Glockner, Rolf; Spani, Hans; and Stutz, Hansruedi, to Gebruder Loepfe AG. Electronic device for controlling the function of an electronic yarn clearer. 4,169,399, Cl. 83-361.000.

Gloeckler, Alfred M., to Etablissements Superba S.A. Process for treatment of yarn within a steaming chamber. 4,169,707, Cl. 8-149.300.

Glover, Brian: *See*—
Boyd, Violet; Fishwick, Brian R.; Glover, Brian; Korn, Stewart R.; and Bostock, Susan M., 4,169,705, Cl. 8-41.00C.

Gmoehling, Werner: *See*—
Freissmuth, Alfred; Gmoehling, Werner; Roeck, Heinrich; and Kniep, Peter, 4,169,724, Cl. 75-58.000.

Goebel, Robert H.; and Fogle, Dale A., to United States of America, Air Force. Clutter discriminating fuze apparatus. 4,170,008, Cl. 343-7.0PF.

Goldie, Harry, to United States of America, Air Force. Adding frequency agility to fire-control radars. 4,170,007, Cl. 343-5.00R.

Goldman, Jerome N.: *See*—
DiMarchi, Silvio J.; Goldman, Marvin A.; Gilmore, Arthur; and Goldman, Jerome N., 4,169,378, Cl. 73-353.000.
Goldman, Marvin A.; Goldman, Jerome N.; Gilmore, Arthur; and DiMarchi, Silvio J., 4,169,382, Cl. 73-376.000.

Goldman, Marvin A.; Goldman, Jerome N.; Gilmore, Arthur; and DiMarchi, Silvio J., to Penn-Plax Plastics, Inc. Aquarium thermometer. 4,169,382, Cl. 73-376.000.

Goldman, Marvin A.: *See*—
DiMarchi, Silvio J.; Goldman, Marvin A.; Gilmore, Arthur; and Goldman, Jerome N., 4,169,378, Cl. 73-353.000.

Goloff, Alexander; and Cemenska, Richard A., to Caterpillar Tractor Co. Cooled engine valve. 4,169,488, Cl. 137-340.000.

Golovinov, Mikhail F.: *See*—
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.

Goodyear, Hugo: *See*—
Schonberger, Abram, 4,169,391, Cl. 74-5.00R.

Goodyear Tire & Rubber Company, The: *See*—
Olsen, Richard J.; Brinkley, Max D.; and Thiele, John R., 4,169,877, Cl. 264-315.000.

Goossens, Alfred E.: *See*—
Mussinan, Cynthia J.; Mookherjee, Braja D.; Goossens, Alfred E.; and Vock, Manfred H., 4,169,900, Cl. 426-536.000.

Gordon, Eric M., to E. R. Squibb & Sons, Inc. Reactions of thiooxime cephalosporin and penicillin derivatives. 4,169,946, Cl. 544-21.000.

Goto, Kazuhiro: *See*—
Shiroki, Masami; Maruyama, Yutaka; and Goto, Kazuhiro, 4,169,899, Cl. 424-246.000.

Goto, Mikio: *See*—
Yoshikawa, Yoshio; Nawata, Takanari; Goto, Mikio; and Fujii, Yuichi, 4,169,811, Cl. 252-408.000.

Gould Inc.: *See*—
Geil, Ronald J., 4,170,016, Cl. 346-140.00R.

Graaff Kommanditgesellschaft: *See*—
Dorpmund, Willi, 4,169,407, Cl. 98-32.000.

Graboski, James J., to Union Carbide Corporation. Multilayer film including polyolefin layers and a polybutylene layer useful for the production of bags. 4,169,910, Cl. 428-35.000.

Grady, Raymond J., to Huyck Corporation. Shuttle box for looms. 4,169,492, Cl. 139-185.000.

Gray, William M.: *See*—
Otteman, John H.; and Gray, William M., 4,169,486, Cl. 137-240.000.

Greeott, George S. Invertible garden sprinkler. 4,169,557, Cl. 239-443.000.

Gregory, Luther W., administrator: *See*—
Taylor, Richard L.; Drosd, Ralph D., deceased; and Gregory, Luther W., administrator, 4,169,993, Cl. 325-470.000.

Greif Bros. Corporation: *See*—
Reese, Robert H.; and Facko, Gerhardt, 4,169,326, Cl. 40-306.000.

Grenier, Georges E., to Agence Nationale de Valorisation de la Recherche (ANVAR). Transparency projector comprising a plurality of optical systems. 4,169,668, Cl. 353-90.000.

Grenoble, Dane C.: *See*—
Murrell, Lawrence L.; Grenoble, Dane C.; and DeLuca, John P., 4,169,883, Cl. 423-628.000.

Grimm, Nelson: *See*—
Laska, Harry M.; and Grimm, Nelson, 4,169,875, Cl. 264-63.000.

Grote, Johannes J. Artificial middle ear and ear canal prosthesis. 4,169,292, Cl. 3-1.900.

Gruber, William C., to International Business Machines Corporation. Tab layout display for a typewriter. 4,169,685, Cl. 400-705.400.

Gruber, Wolfgang; Frielingsdorf, Hans; Bachl, Robert; and Schweier, Guenther, to BASF Aktiengesellschaft. Manufacture of olefin polymers. 4,169,925, Cl. 526-96.000.

Grunbaum, Peter, to Binder & Co. Aktiengesellschaft. Screening machine. 4,169,788, Cl. 209-328.000.

Gruppo Lepetit S.p.A.: *See*—
Cricchio, Renato, 4,169,834, Cl. 260-239.30P.

GTE Laboratories Incorporated: *See*—
Epstein, James, 4,169,920, Cl. 429-154.000.

GTE Sylvania Incorporated: *See*—
Amstutz, O. Wendell; Dickinson, William A.; and Kreidler, James F., 4,170,027, Cl. 358-246.000.
Brower, Boyd G., 4,170,034, Cl. 362-12.000.

Guenther, William D., to Dana Corporation. Internal combustion engine with stepped piston supercharger. 4,169,434, Cl. 123-47.00A.

Gulf Oil Corporation: *See*—
Gilbert, Ronald E.; Lynch, Thomas J.; and Rowatt, Robert J., 4,169,826, Cl. 260-33.6PQ.
Hill, Robert W.; Lynch, Thomas J.; and Wisneski, Peter M., 4,169,927, Cl. 526-124.000.

Gunnerson, Robert E., to Campbell Soup Company. Apparatus and method for liquid separation of materials. 4,169,787, Cl. 209-173.000.

Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, to Hoechst Aktiengesellschaft. Mixtures of optical brighteners. 4,169,810, Cl. 252-301.240.

Gustafson, Richard H.; and Kemp, Gordon A., to American Cyanamid Company. Method for the control of swine dysentery with antibiotic BM123γ and certain derivatives thereof. 4,169,891, Cl. 424-181.000.

Gutierrez, Eddie N.: *See*—
Lamberti, Vincent; and Gutierrez, Eddie N., 4,169,842, Cl. 260-346.740.
Lamberti, Vincent; and Gutierrez, Eddie N., 4,169,957, Cl. 562-564.000.

Guyot, Volker; Maus, Otfrid; and Mueller, Martin, to Carl Schenck AG. Process and a device for the indication of the extent of unbalance of a part to be balanced. 4,169,383, Cl. 73-462.000.

Gylseth, Herman M.: *See*—
Drew, Gene R.; Gylseth, Herman M.; Van Buskirk, William O.; and Newkirk, Richard V., 4,169,568, Cl. 244-148.000.

Haase, Donald A.; and Tamalenus, Frank E., to Mobil Oil Corporation. Animal repellant mixture of undecanone-2 and 3-phenylpropenal. 4,169,898, Cl. 424-331.000.

Habu, Takeshi: *See*—
Iytaka, Tateshi; Matsuo, Syunji; Nagatani, Toshio; Takahashi, Kazuo; and Habu, Takeshi, 4,169,733, Cl. 96-50.0PT.

Hagerman, William O.: *See*—
Johnson, Victor R., Jr.; and Hagerman, William O., 4,169,791, Cl. 210-71.000.

Halcon Research & Development Corporation: *See*—
Pugach, Joseph, 4,169,809, Cl. 252-186.000.

Hall, David J. Electronic reflex game. 4,169,592, Cl. 273-1.00E.

Hall, David L., to Keystone International, Inc. Amplitude responsive detector. 4,169,543, Cl. 222-56.000.

Hall, Donald D.: *See*—
Wetzel, Robert E.; Miranti, Joseph P., Jr.; and Hall, Donald D., 4,169,393, Cl. 74-233.000.

Hallstrom, James R.; Klatt, Kenneth G.; and Walling, Ronald L., to Rexnord Inc. Wear resistant coated pipe and method of making it. 4,169,906, Cl. 427-183.000.

Hamer, Edward G., to United States of America, Air Force. Multiple channel electronic countermeasures receiver system. 4,170,009, Cl. 343-18.00E.

Handy, Roland J.; and Zimmerman, Thomas A., to TRW Inc. Logic gate utilizing charge transfer devices. 4,170,041, Cl. 364-784.000.

Hanka, Ladislav J.; and Martin, David G., to Upjohn Company, The. Composition of matter and process. 4,169,888, Cl. 424-121.000.

Hanke, Wolfgang, to Nopa GmbH. Connector. 4,169,651, Cl. 339-217.00R.

Hannigsberg, Claude: *See*—
Bessard, Jacques; Dallemagne, Robert; and Hannigsberg, Claude, 4,169,969, Cl. 179-84.0VF.

Hans List: *See*—
Krempl, Peter, 4,169,387, Cl. 73-708.000.

Hanseatischer Maschinenbau G.m.b.H.: *See*—
Kaiser, Hans, 4,169,301, Cl. 19-129.00R.

Hansen, Borge M.; Andersen, Per; Hoppmann, Uwe W.; and Bebe, Hans J., to Danfoss A/S. Defrosting apparatus for a refrigerator. 4,169,358, Cl. 62-154.000.

Hanson, Ralph W. Bomb circuit disrupting device and method. 4,169,403, Cl. 86-1.00B.

Harada, Hideki; Yamashita, Keitaro; and Yamamoto, Katsunobu, to Hitachi Metals, Ltd. Iron core assembly for magnetizing columnar permanent magnets for use in electrostatic developing apparatus. 4,169,998, Cl. 335-284.000.

Hardtmann, Goetz E., to Sandoz, Inc. 4-Hydroxy-naphthpyridine-2(1H)-one-3-carboxylic acids and esters. 4,169,893, Cl. 424-258.000.

Harker, Royce K.: *See*—
Clarke, John T.; Harker, Royce K.; Hittmeier, Michael E.; and Eaton, James W., 4,169,748, Cl. 156-62.200.

Harris, George M. Platform bed frame. 4,169,294, Cl. 5-200.00R.

Hartness, Robert G.: *See*—
Hartness, Thomas P.; and Hartness, Robert G., 4,169,342, Cl. 53-248.000.

Hartness, Thomas P.; and Hartness, Robert G. Article separating device for case loading machine. 4,169,342, Cl. 53-248.000.

Hasegawa, Tsutomu: *See*—
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, 4,169,803, Cl. 252-62.900.

Hasman, John M., to SCM Corporation. Hydrogenation of unrefined glyceride oils. 4,169,844, Cl. 260-409.000.

Hatfield, David G., to Interpace Corporation. Method and apparatus for decorating surfaces of ceramic ware. 4,169,908, Cl. 427-287.000.

Hatlapa, Rolf; and Horn, Bernd, to Hatlapa Uetersener Maschinenfabrik GmbH. Hydraulic winch for shipboard use. 4,169,580, Cl. 254-186.00R.

Hatlapa Uetersener Maschinenfabrik GmbH: *See*—
Hatlapa, Rolf; and Horn, Bernd, 4,169,580, Cl. 254-186.00R.

Haubner, James W. Food processing equipment. 4,169,409, Cl. 99-629.000.

Haug, Henry W.; Shon, Gary M.; and Lenhardt, Albert P. Storge tank especially suitable for use in a solar heat system. 4,169,461, Cl. 126-437.000.

Hauslein, Reinhard, to Melitta-Werke Bentz & Sohn KG. Temperature control device for a coffee or tea maker. 4,169,978, Cl. 219-297.000.

Hay, Louis E.: *See*—
Mercer, Roger W.; and Hay, Louis E., 4,169,314, Cl. 32-32.000.

Hayden, Douglas B., Jr.: *See*—
Eddleman, William L., 4,169,776, Cl. 204-118.000.

Hayes, John C., to UOP Inc. Acidic multimetallic catalytic composite. 4,169,813, Cl. 252-441.000.

Hayes, Robert A.; and Frendreis, James A., to Union Special Corporation. Automatic chain-stitch sewing machine. 4,169,422, Cl. 112-121.120.

Haynes, Joseph R.; Wainwright, William F.; and Morris, Frank D., to Fisher-Haynes Corp. of Georgia. Egg carton display rack and basket. 4,169,416, Cl. 108-26.000.

Heathcott, Joe W. Rod seal. 4,169,604, Cl. 277-125.000.

Heddon, Will. Prefabricated bowling lane. 4,169,602, Cl. 273-51.000.

Heitmann, Glenn A.; and Trosper, Milton F., Jr., to Johns-Manville Corporation. Fire resistant foam products. 4,169,915, Cl. 428-310.000.

Henderson Mfg. Co.: *See*—
McKee, Walter L., 4,169,559, Cl. 239-672.000.

Hendry, Harold M. Adjustable lubrication quality indicator-protector for engines and other machines. 4,169,368, Cl. 73-10.000.

Henley, Anthony J. R.; and Nutt, Geoffrey W., to Vero Electronics Limited. Connectors for use in frames for holding circuit cards. 4,169,649, Cl. 339-176.00M.

Henrick, Clive A.: *See*—
Anderson, Richard J.; and Henrick, Clive A., 4,169,860, Cl. 260-601.00R.

Herr, Roy W.: *See*—
Creutz, Hans-Gerhard, deceased; Herr, Roy W.; and Martin, Sylvia, 4,169,771, Cl. 204-55.00R.

Hertman, Israel; Michael, Ammon; and Markenson, Jacob. Fowl cholera vaccine and its preparation. 4,169,886, Cl. 424-92.000.

Hervot, Emmanuel: *See*—
Fleck, Fritz; Hervot, Emmanuel; Merk, Peter; Schmid, Horst; and Wiedemann, Achim, 4,169,702, Cl. 8-1.00W.

Herzl, Peter J., to Fischer & Porter Company. External sensing system for vortex-type flowmeters. 4,169,376, Cl. 73-194.0VS.

Hess, Hans-Jurgen E.; and Johnson, Michael R., to Pfizer Inc. Antisecretory 16,16-dimethyl-17-oxaprostaglandins. 4,169,895, Cl. 424-320.000.

Hessert, James E.: *See*—
Johnston, Chester C., Jr.; Bertus, Brent J.; and Hessert, James E., 4,169,797, Cl. 252-8.55C.

Hesston Corporation: *See*—
Lutz, Bruce L.; and Buller, Richard J., 4,169,411, Cl. 100-255.000.

Heyer, Willi: *See*—
Weirich, Walter; Dettmers, Michael; Rassmann, Christoph; Heyer, Willi; Beyer, Herbert; and Linke, Horst, 4,169,689, Cl. 405-291.000.

Hickman, Ronald P., to Inventec International Limited. Workbenches. 4,169,606, Cl. 269-139.000.

Hickmann, Horst R., to Ohio Medical Instrument Company, Inc. Surgical head clamp. 4,169,478, Cl. 128-346.000.

Higgins, Raymond: *See*—
Bamforth, John R.; and Higgins, Raymond, 4,169,865, Cl. 585-314.000.

Highland, Stanley E. Skip brake units. 4,169,522, Cl. 188-65.200.

Hilfman, Lee, to UOP Inc. Hydrocarbon conversion catalytic composite. 4,169,783, Cl. 208-111.000.

Hill, Robert W.; Lynch, Thomas J.; and Wisneski, Peter M., to Gulf Oil Corporation. Process for the polymerization of ethylene. 4,169,927, Cl. 526-124.000.

Hiltebrandt, Siegfried, to Wolf Medical Instruments Corporation. Applicator for surgical clip. 4,169,476, Cl. 128-325.000.

Hiraga, Yoichi: *See*—
Kikuchi, Mitsuo; and Hiraga, Yoichi, 4,169,881, Cl. 423-321.00R.

Hirano, Tadayoshi; and Kawagoe, Michio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Arrangement for controlling an air-fuel ratio of an air-fuel mixture of an internal combustion engine. 4,169,441, Cl. 123-119.0EC.

Hiratake, Susumu; and Matsui, Mitsuhiro, to Daidoseiko Kabushikikaisha. Heat treating apparatus. 4,169,962, Cl. 13-2.00P.

Hirayama, Eiichi: *See*—
Tsunemoto, Shiro; Mizuguchi, Teruki; and Hirayama, Eiichi, 4,169,405, Cl. 92-13.600.

Hirosawa, Hidenori: *See*—
Iwata, Minoru; Yasuda, Takeru; and Hirosawa, Hidenori, 4,169,352, Cl. 60-276.000.

Hirsh, Aaron: *See*—
Yefsky, Howard; and Hirsh, Aaron, 4,169,624, Cl. 296-37.120.

Hirt, Manfred; and Leiber, Wolfgang, to Carl Hurth Maschinen-und Zahnradfabrik. Lubricating device for transmissions or the like in starting condition. 4,169,519, Cl. 184-6.300.

Hitachi, Ltd.: *See*—
Inoue, Masaru; Ishikawa, Makoto; and Fukuda, Kenji, 4,169,678, Cl. 356-321.000.
Oguro, Tomokatsu; Ishida, Yoshio; Tsuzurahara, Mamoru; and Kobayashi, Satoshi, 4,169,987, Cl. 315-39.510.
Tsuchihashi, Akira, 4,169,404, Cl. 91-61.000.

Hitachi Metals, Ltd.: *See*—
Harada, Hideki; Yamashita, Keitaro; and Yamamoto, Katsunobu, 4,169,998, Cl. 335-284.000.

Hitachi Shipbuilding & Engineering Co., Ltd.: *See*—
Inaba, Hideya; Kamino, Yasumi; Onizuka, Shigenori; and Inazumi, Chikashi, 4,169,814, Cl. 252-441.000.

Hittmeier, Michael E.: *See*—
Clarke, John T.; Harker, Royce K.; Hittmeier, Michael E.; and Eaton, James W., 4,169,748, Cl. 156-62.200.

Hitzman, Donald O., to Phillips Petroleum Company. Self-toxification process for aerobic fermentation. 4,169,762, Cl. 435-243.000.

Hockele, Max; and Ruff, Helmut, to Karl Pfisterer Elektrotechnische. Method and apparatus for connecting electrical conductors. 4,169,652, Cl. 339-246.000.

Hodge, Malcolm H., to TRW Inc. Fiber optic interface for combined signal transmission and detection. 4,169,656, Cl. 350-96.150.

Hodge, Peter C.; and May, William S., to Lucas Industries Limited. Air heater system. 4,169,448, Cl. 123-179.00H.

Hodgson, John: *See*—
Cooke, William E.; and Hodgson, John, 4,169,770, Cl. 204-28.000.

Hoechst Aktiengesellschaft: *See*—
Arpe, Hans-Jurgen, 4,169,959, Cl. 568-672.000.
Berthold, Rudiger; and Tronich, Wolfgang, 4,169,851, Cl. 260-562.00K.
Burg, Karlheinz; and Kirsch, Gunther, 4,169,867, Cl. 525-417.000.
Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, 4,169,810, Cl. 252-301.240.
Hoheisel, Klaus; Bollert, Ulrich; and Janocha, Siegfried, 4,169,935, Cl. 528-287.000.
Hunger, Klaus, 4,169,830, Cl. 260-157.000.
Landauer, Franz, 4,169,852, Cl. 260-564.0RF.
Werner, Gerhard; Tietz, Hans-Jurgen; Wagner, Reinhard; and Dathe, Wolfgang, 4,169,821, Cl. 260-27.0BB.

Hoheisel, Klaus; Bollert, Ulrich; and Janocha, Siegfried, to Hoechst Aktiengesellschaft. Biaxially oriented polyester film with a flame-retardant finish and use thereof. 4,169,935, Cl. 528-287.000.

Hokushin Electric Works, Ltd.: *See*—
Suzuki, Kazuie, 4,169,375, Cl. 73-194.0EM.

Hollar, Arthur W., Jr., to General Motors Corporation. Reclining vehicle seat. 4,169,626, Cl. 297-365.000.

Holmes, Robert H.: *See*—
Ragard, Phillip A.; and Holmes, Robert H., 4,169,541, Cl. 221-281.000.

Holset Engineering Company Limited: *See*—
Walsham, Brian E.; Bruffell, William K.; and Atkin, Howard S., 4,169,355, Cl. 60-682.000.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Ishikawa, Masaru; Katagiri, Nagatoshi; Enoki, Shigenaga; and Ohta, Kozo, 4,169,512, Cl. 180-205.000.

Honda, Ichiro. Speaker system. 4,169,516, Cl. 181-153.000.

Honeywell Inc.: *See*—
LeFrois, Richard T., 4,169,499, Cl. 165-1.000.

Hooker Chemicals & Plastics Corp.: *See*—
Lai, Peter; Szymanski, Stanley; and Christensen, Norman L., 4,169,773, Cl. 204-98.000.
Takahashi, Akio, 4,169,870, Cl. 525-315.000.

Hooper, Robert E., to General Motors Corporation. Ball bearing retainer. 4,169,636, Cl. 308-201.000.

Hopkins, John R.: *See*—
Stape, William J.; Hopkins, John R.; and Weber, Robert N., 4,169,646, Cl. 339-99.00R.

Hoppmann, Uwe W.: *See*—
Hansen, Borge M.; Andersen, Per; Hoppmann, Uwe W.; and Bebe, Hans J., 4,169,358, Cl. 62-154.000.

Horak, Alan A.; O'Donnell, Richard T.; McGill, Robert W.; and Bianchi, David L., to A-T-O, Inc. Bottle gripping device. 4,169,621, Cl. 294-116.000.

Hori, Makoto: *See*—
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, 4,169,803, Cl. 252-62.900.

Horioka, Mikihiko: *See*—
Shiohara, Tomoo; and Horioka, Mikihiko, 4,169,819, Cl. 260-23.0XA.

Horiuchi, Yukio: *See*—
Miyazawa, Takeo; Horiuchi, Yukio; Akita, Eiichi; Umezawa, Hamao; and Umezawa, Sumio, 4,169,890, Cl. 424-180.000.

Horn, Bernd: *See*—
Hatlapa, Rolf; and Horn, Bernd, 4,169,580, Cl. 254-186.00R.

Horsfall, David W. Dense medium separation. 4,169,786, Cl. 209-12.000.

Horvath, Imre; Kwasnitza, Kurt; and Meyer, Gundolf, to BBC Brown, Boveri & Company Limited. Electrical superconductor. 4,169,964, Cl. 174-15.00S.

Hoskinson, James H. Screw removing tool. 4,169,395, Cl. 81-5.10R.

Houbiers, Joannes P. M.; and Thijssen, Francina H. J., to Oce-Andeno B.V. Method of preparing a 3-iodothiophene. 4,169,839, Cl. 549-81.000.

Howard, Robert P.: *See*—
Walls, James A.; and Howard, Robert P., 4,169,465, Cl. 128-719.000.

Huang, Liang H.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Jefferson, Mark T.; Huang, Liang H.; Shibakawa, Riichiro; and Tone, Junsuke, 4,169,887, Cl. 424-119.000.

Hughes, O. Richard, to Celanese Corporation. Hydroformylation process. 4,169,861, Cl. 260-604.0HF.

Hultberg, Ake A. Ashtray with depressible resilient central section. 4,169,481, Cl. 131-237.000.

Humphreys, Victor T.: *See*—
Burke, Oliver W., Jr., deceased; and Humphreys, Victor T., 4,169,737, Cl. 106-308.00M.

Hunger, Klaus, to Hoechst Aktiengesellschaft. Diamino-benzanilide disazo coloring agents. 4,169,830, Cl. 260-157.000.

Hunsicker, Glen G., to Neale, Dory J., Sr., a part interest. Compound slingshot. 4,169,453, Cl. 124-20.00R.

Hunter, Byron A.; and Barrows, Franklin H., to Uniroyal, Inc. 3,3-Carbonylbis(carbazates) as blowing agents. 4,169,954, Cl. 560-158.000.

Hunter, James R., to Burroughs Corporation. Item transport apparatus comprising a variable thickness carrier device. 4,169,529, Cl. 198-473.000.

Hustler, Inc.: *See*—
Stefano, Patrick L., 4,169,575, Cl. 248-539.000.

Huyck Corporation: *See*—
Grady, Raymond J., 4,169,492, Cl. 139-185.000.

Hysell, Robert E.; and Piccone, Dante E., to General Electric Company. Semiconductor device with variable grid openings for controlling turn-off pattern. 4,170,019, Cl. 357-22.000.

IEC-Holden Ltd.: *See*—
Winsor, Robert B., 4,169,415, Cl. 105-483.000.

Igoe, Robert S., to Merck & Co., Inc. Direct acidified yogurt. 4,169,854, Cl. 426-583.000.

Illinois Tool Works Inc.: *See*—
Flair, Henry J., 4,169,691, Cl. 409-10.000.
McArdle, Edward J., 4,169,343, Cl. 53-398.000.
Wagner, David P., 4,169,630, Cl. 301-9.0DN.

Imperial Chemical Industries, Inc.: *See*—
Wadsworth, Cyril; and Amstell, Horace E., 4,169,398, Cl. 83-346.000.

Imperial Chemical Industries Limited: *See*—
Bamforth, John R.; and Higgins, Raymond, 4,169,865, Cl. 585-314.000.
Boyd, Violet; Fishwick, Brian R.; Glover, Brian; Korn, Stewart R.; and Bostock, Susan M., 4,169,705, Cl. 8-41.00C.

Inaba, Hideya; Kamino, Yasumi; Onizuka, Shigenori; and Inazumi, Chikashi, to Hitachi Shipbuilding & Engineering Co., Ltd. Process for producing catalysts comprising a carrier impregnated with a solution of chloroplatinic acid and barium hydroxide for decomposing ammonia by oxidation. 4,169,814, Cl. 252-441.000.

Inada, Masami; and Ohumi, Takeharu, to Aisin Seiki Kabushiki Kaisha. Fluid flow control valve mechanism. 4,169,489, Cl. 137-545.000.

Inagaki, Kenji: *See*—
Kidani, Yoshinori; and Inagaki, Kenji, 4,169,846, Cl. 260-429.00R.

Inamoto, Yoshiaki; Aigami, Koji; Takaishi, Naotake; and Nakajima, Motoki, to Kao Soap Co., Ltd. 3-Alkoxy-4-homoisotwistanes. 4,169,958, Cl. 568-665.000.

Inamoto, Yoshiaki: *See*—
Aigami, Koji; Inamoto, Yoshiaki; Ohsugi, Motoyoshi; Fujikura, Yoshiaki; and Takaishi, Naotake, 4,169,953, Cl. 560-117.000.

Inazumi, Chikashi: *See*—
Inaba, Hideya; Kamino, Yasumi; Onizuka, Shigenori; and Inazumi, Chikashi, 4,169,814, Cl. 252-441.000.

Indak Manufacturing Corp.: *See*—
Black, Charles E., III; and Raab, Andrew F., 4,169,972, Cl. 200-153.00K.

Indesit Industria Elettrodomestitici Italiana S.p.A.: *See*—
Zappala, Giuseppe, 4,169,989, Cl. 315-408.000.

Industrie Pirelli S.p.A.: *See*—
Maiocchi, Luigi, 4,169,495, Cl. 152-361.00R.

Ing. C. Olivetti & C., S.p.A.: *See*—
Bernardis, Francesco; and Bisone, Dario, 4,169,683, Cl. 400-124.000.

Ingenieursbureau Marcon (Marine Consultants) B.V.: *See*—
Wipkink, Johannes; and Johansen, Harald, 4,169,296, Cl. 14-71.100.

Innothera: *See*—
Robba, Max F.; and Aurousseau, Michel E., 4,169,892, Cl. 424-248.510.

Inoue, Masaru; Ishikawa, Makoto; and Fukuda, Kenji, to Hitachi, Ltd. Spectrophotometer. 4,169,678, Cl. 356-321.000.

Inoue, Shigeo: *See*—
Miyamoto, Norioki; and Inoue, Shigeo, 4,169,850, Cl. 260-561.00S.
Yoshioka, Kengo; Nozato, Teruichi; Uchiyama, Haruki; Satoh, Akira; Inoue, Shigeo; Togino, Yuji; Mori, Keisuke; and Satou, Ituro, 4,169,700, Cl. 431-174.000.

Inoue, Yoshio: *See*—
Noshiro, Atsumi; Obata, Hiroyuki; Takamizawa, Minoru; and Inoue, Yoshio, 4,169,731, Cl. 96-1.00R.

Institut Merieux: *See*—
Plan, Robert; Liautaud, Jacques; Makula, Marie-France; Gattel, Paule; Pla, Jean; and Debrus, Andre, 4,169,829, Cl. 260-122.000.

Precausta, Pierre; Bugand, Marc; Comte, Philippe; and Zwingelstein, Georges, 4,169,761, Cl. 435-235.000.

Institut National de la Sante et de la Recherche Medicale - I.N.-S.E.R.M.: *See*—
Rabischong, Pierre; and Bel, Jean-Pierre, 4,169,467, Cl. 128-80.00G.

Institute of Gas Technology: *See*—
Weil, Sanford A.; Rush, William F.; Wurm, Jaroslav; and Dufour, Raymond J., 4,169,362, Cl. 62-478.000.

International Business Machines Corporation: *See*—
Beacom, Thomas J.; Kindseth, Douglas M.; and Mitchell, Glen R., 4,170,039, Cl. 364-200.000.
Beuch, Wallace E.; Larson, Curtis A.; Zell, Michael N.; and Fournier, Thomas R., 4,170,031, Cl. 360-98.000.
Castrodale, Daniel O.; and Fournier, Thomas R., 4,170,030, Cl. 360-98.000.
Czornyj, George; Swalen, Jerome D.; and Wu, Anthony W., 4,169,904, Cl. 427-44.000.
Gruber, William C., 4,169,685, Cl. 400-705.400.
Klein, Wilfried; Klink, Erich; Rudolph, Volker; and Wernicke, Friedrich, 4,170,017, Cl. 357-15.000.
Ross, Charles O., 4,169,991, Cl. 318-599.000.
Shipley, John F., 4,169,732, Cl. 96-35.100.

International Environmental Mfg. Co.: *See*—
Braver, Alvin S., 4,169,500, Cl. 165-50.000.

International Flavors & Fragrances Inc.: *See*—
Mussinan, Cynthia J.; Mookherjee, Braja D.; Goossens, Alfred E.; and Vock, Manfred H., 4,169,900, Cl. 426-536.000.

International Harvester Company: *See*—
Phillips, Carmen S., 4,169,347, Cl. 56-341.000.

International Rectifier Corporation, Japan Ltd.: *See*—
Sueoka, Tetsuro; and Udagawa, Hisao, 4,170,020, Cl. 357-38.000.

International Telephone and Telegraph Corporation: *See*—
Koeneman, Paul W.; and Emanuel, Peter R., 4,169,617, Cl. 292-149.000.

Interpace Corporation: *See*—
Hatfield, David G., 4,169,908, Cl. 427-287.000.

Inventec International Limited: *See*—
Hickman, Ronald P., 4,169,606, Cl. 269-139.000.

Ipri, Alfred C.; and Scott, Joseph H., Jr., to RCA Corporation. Method for making silicon on sapphire transistor utilizing predeposition of leads. 4,169,746, Cl. 148-175.000.

Irwin, Robert S., to Du Pont de Nemours, E. I., and Company. Process for spinning flame-resistant acrylonitrile polymer fibers. 4,169,876, Cl. 264-206.000.

Ishida, Yoshio: *See*—
Oguro, Tomokatsu; Ishida, Yoshio; Tsuzurahara, Mamoru; and Kobayashi, Satoshi, 4,169,987, Cl. 315-39.510.

Ishii, Hideki: *See*—
Yamada, Tsutomu; and Maeno, Jun, 4,169,661, Cl. 350-353.000.

Ishikawa, Makoto: *See*—
Inoue, Masaru; Ishikawa, Makoto; and Fukuda, Kenji, 4,169,678, Cl. 356-321.000.

Ishikawa, Masaru; Katagiri, Nagatoshi; Enoki, Shigenaga; and Ohta, Kozo, to Honda Giken Kogyo Kabushiki Kaisha. Power unit swinging type motor cycles. 4,169,512, Cl. 180-205.000.

Itoh, Mitsugu: *See*—
Amano, Shoichi; Miyadoh, Shinji; Itoh, Mitsugu; Ezaki, Norio; Akita, Eiichi; and Yamada, Yujiro, 4,169,889, Cl. 424-122.000.

Iwase, Hirohide; Maeda, Yukio; and Sugitani, Tatsuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method for evaluating surges of motor vehicles. 4,169,370, Cl. 73-116.000.

Iwase, Kazuo; and Katsuoka, Ritsu, to Nippon Soken, Inc. Electronic ignition timing control system for internal combustion engine. 4,169,438, Cl. 123-117.00D.

Iwata, Minoru; Yasuda, Takeru; and Hirosawa, Hidenori, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Aisaon Industry Co., Ltd. Exhaust gas cleaning apparatus of an internal combustion engine. 4,169,352, Cl. 60-276.000.

Iytaka, Tateshi; Matsuo, Syunji; Nagatani, Toshio; Takahashi, Kazuo; and Habu, Takeshi, to Konishiroku Photo Industry Co., Ltd. Process for forming high-contrast silver images. 4,169,733, Cl. 96-50.0PT.

J. H. Fenner & Co. Limited: *See*—
Fryatt, Leslie A., 4,169,530, Cl. 198-835.000.

J. I. Case Company: *See*—
McDonald, Raymond F., 4,169,392, Cl. 74-197.000.

J. J. Barker Company Limited: *See*—
Barker, John C.; and McLaughlin, Ivan P., 4,169,907, Cl. 427-264.000.

J. M. Voith GmbH: *See*—
Wohrle, Albert, 4,169,425, Cl. 118-665.000.

Jackson, Robert V.; and Anderson, Harold F., deceased, to McCulloch Corporation. CDI Method and system with in phase coils. 4,169,446, Cl. 123-148.0CC.

Jackson, Winston J., Jr.; and Morris, John C., to Eastman Kodak Company. Liquid crystal copolyesters containing terephthalic acid and 2,6-naphthalenedicarboxylic acid. 4,169,933, Cl. 528-190.000.

Jacobsson, Jan R., to AGA Aktiebolag. Protective device for protection against radiation during welding. 4,169,655, Cl. 350-1.700.

Jahami, Yoshimine: *See*—
Katayama, Toshio; Fujiwara, Kunihisa; and Jahami, Yoshimine, 4,169,701, Cl. 432-58.000.

Jakusch, Helmut: *See*—
Schonafinger, Eduard; Deigner, Paul; Ohlinger, Manfred; Jakusch, Helmut; Amort, Jurgen; Nestler, Heinz; Seiler, Claus-Dietrich; and Ambros, Otto, 4,169,912, Cl. 428-145.000.

Janocha, Siegfried: *See*—
Hoheisel, Klaus; Bollert, Ulrich; and Janocha, Siegfried, 4,169,935, Cl. 528-287.000.

Jauros, Ensi A.; and Ojala, Tapani M., to A. Ahlstrom Osakeyhtio. Method and apparatus for fire extinguishing. 4,169,508, Cl. 169-47.000.

Jaworski, Eugene: *See*—
Breslow, Jeffrey D.; Kuna, Wayne A.; and Jaworski, Eugene, 4,169,334, Cl. 46-103.000.

Jean Walterscheid GmbH: *See*—
Balensiefen, Heinrich; and von Allworden, Wilhelm, 4,169,686, Cl. 403-12.000.

Jefferson, Mark T.: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Jefferson, Mark T.; Huang, Liang H.; Shibakawa, Riichiro; and Tone, Junsuke, 4,169,887, Cl. 424-119.000.

Jensen, Harbo P., to Chevron Research Company. Process for comminuting and reducing the sulfur and ash content of coal. 4,169,710, Cl. 44-1.0SR.

Jensen, Thomas H., to PPG Industries, Inc. Apparatus for threading moving strands. 4,169,551, Cl. 226-92.000.

Jidosha Kiki Co., Ltd.: *See*—
Masuda, Naosuke; and Yamaguchi, Sumio, 4,169,695, Cl. 417-311.000.

Johansen, Harald: *See*—
Wipkink, Johannes; and Johansen, Harald, 4,169,296, Cl. 14-71.100.

Johansen, Johan K. Exercising device. 4,169,590, Cl. 272-142.000.

Johns-Manville Corporation: *See*—
Heitmann, Glenn A.; and Trosper, Milton F., Jr., 4,169,915, Cl. 428-310.000.

Johnson & Johnson: *See*—
Morris, Henrietta K., 4,169,472, Cl. 128-132.00D.

Johnson, Michael R.: *See*—
Hess, Hans-Jurgen E.; and Johnson, Michael R., 4,169,895, Cl. 424-320.000.

Johnson, Richard V.: *See*—
DeBenedictis, Leonard C.; and Johnson, Richard V., 4,170,028, Cl. 358-285.000.

Johnson, Victor R., Jr.; and Hagerman, William O., to Waste Management, Inc. Apparatus and process for volume reduction of aqueous waste through solar evaporation. 4,169,791, Cl. 210-71.000.

Johnston, Chester C., Jr.; Bertus, Brent J.; and Hessert, James E., to Phillips Petroleum Company. Composition for acidizing subterranean formations. 4,169,797, Cl. 252-8.55C.

Jolas, Fernand: *See*—
Stiker, Bernard; and Jolas, Fernand, 4,169,780, Cl. 204-206.000.

Jonas, Klaus, to Studiengessellschaft Kohle mbH. Method of preparing transition metal-olefin complex compounds and alkali metal-transition metal-olefin complex compounds. 4,169,845, Cl. 260-429.0CY.

Jones, James C., to Owens-Illinois, Inc. Coating composition comprising an aqueous emulsion of polyethylene containing a water-soluble polyethylene oxide. 4,169,823, Cl. 260-29.6NR.

Jones, Lonnie M. Combination of an archery bow, bow stabilizer and arrow head extractor. 4,169,454, Cl. 124-23.00R.

Joy Manufacturing Company: *See*—
Badino, Charles L., 4,169,794, Cl. 210-330.000.

Kabushiki Kaisha Fujikoshi: *See*—
Nishimoto, Takashi; Suzuki, Seiichi; and Takamori, Hiroyoshi, 4,169,605, Cl. 277-188.00A.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Takeuchi, Sadatoshi; and Kurihara, Osamu, 4,169,501, Cl. 165-126.000.

Kabushiki Kaisha Meidensha: *See*—
Sueoka, Tetsuro; and Udagawa, Hisao, 4,170,020, Cl. 357-38.000.

Kadija, Igor V.; and Patel, Harshad M., to Olin Corporation. Method of treating asbestos diaphragms for electrolytic cells. 4,169,774, Cl. 204-98.000.

Kahn, Donald D., to Minnesota Mining and Manufacturing Company. Multiple speed drive mechanism for cassette recorders. 4,170,029, Cl. 360-96.100.

Kaibara, Nobuhiro; Yuzawa, Yasutaka; and Kobayashi, Masayoshi, to Diesel Kiki Company, Ltd. Fuel injection apparatus. 4,169,444, Cl. 123-139.0AQ.

Kaiser, Hans, to Hanseatischer Maschinenbau G.m.b.H. Gilling or stretching apparatus. 4,169,301, Cl. 19-129.00R.

Kaiser, Nils. Method for determining the contents of metabolic products in the blood. 4,169,676, Cl. 356-39.000.

Kalbitzer, Siegfried; Muller, Gerhard; Spear, Walter E.; and Le Comber, Peter G., to Max-Planck-Gesellschaft zur Forderung der Wissenschafter e.V. Method of doping a body of amorphous semiconductor material by ion implantation. 4,169,740, Cl. 148-1.500.

Kaloi, Cyril M., to United States of America, Navy. Corner fed electric microstrip dipole antenna. 4,170,012, Cl. 343-700.0MS.

Kamino, Yasumi: *See*—
Inaba, Hideya; Kamino, Yasumi; Onizuka, Shigenori; and Inazumi, Chikashi, 4,169,814, Cl. 252-441.000.

Kanda, Katsumi: *See*—
Tsutsui, Nobuyuki; Omura, Hitoshi; Mizobe, Takashi; Kanda, Katsumi; and Fujimoto, Terunori, 4,169,916, Cl. 428-447.000.

Kane, James, to Nalco Chemical Company. Red mud treatment. 4,169,824, Cl. 260-29.60M.

Kao Soap Co., Ltd.: *See*—
Aigami, Koji; Inamoto, Yoshiaki; Ohsugi, Motoyoshi; Fujikura, Yoshiaki; and Takaishi, Naotake, 4,169,953, Cl. 560-117.000.
Inamoto, Yoshiaki; Aigami, Koji; Takaishi, Naotake; and Nakajima, Motoki, 4,169,958, Cl. 568-665.000.

Miyamoto, Norioki; and Inoue, Shigeo, 4,169,850, Cl. 260-561.00S.
Karl Mayer Textilmaschinen Fabrik GmbH: *See*—
Kohl, Karl, 4,169,363, Cl. 66-207.000.
Karl Pfisterer Elektrotechnische: *See*—
Hockele, Max; and Ruff, Helmut, 4,169,652, Cl. 339-246.000.
Katagiri, Nagatoshi: *See*—
Ishikawa, Masaru; Katagiri, Nagatoshi; Enoki, Shigenaga; and Ohta, Kozo, 4,169,512, Cl. 180-205.000.
Katayama, Toshio; Fujiwara, Kunihisa; and Jahami, Yoshimine, to Mitsubishi Jukogyo Kabushiki Kaisha; and Yoshizawa Sekkai Kogyo Kabushiki Kaisha. Fluidized-bed kiln with preheating means. 4,169,701, Cl. 432-58.000.
Kato, Sei, to Nihon Senshoku Kikai Kabushiki Kaisha. Liquid stirring apparatus. 4,169,681, Cl. 366-244.000.
Katsuoka, Ritsu: *See*—
Iwase, Kazuo; and Katsuoka, Ritsu, 4,169,438, Cl. 123-117.00D.
Kaugars, Eugene, to Brunswick Corporation. Light weight golf club shaft. 4,169,595, Cl. 273-80.00R.
Kaule, Walter; and Primbsch, Erik, to Krautkramer-Branson, Incorporated. Method and apparatus for producing acoustic waves by laser pulses. 4,169,662, Cl. 350-358.000.
Kawagoe, Michio: *See*—
Hirano, Tadayoshi; and Kawagoe, Michio, 4,169,441, Cl. 123-119.0EC.
Kay Springs, Inc.: *See*—
Weinzimer, Donald H.; and Krakauer, Edwin G., 4,169,307, Cl. 29-243.560.
Keane, Thomas H.: *See*—
Murphy, Randall T.; and Keane, Thomas H., 4,169,627, Cl. 297-452.000.
Keller, John W., Jr.: *See*—
Digby, Dennis; and Keller, John W., Jr., 4,169,480, Cl. 128-419.0PG.
Kelley, Joseph B. Refrigerator and freezer monitoring device. 4,169,357, Cl. 62-126.000.
Kellogg, Seeley C.; Peluso, Philip J.; and Bernardi, Richard B., to Picker Corporation. Frequency synthesizer apparatus and method in ultrasonic imaging. 4,169,385, Cl. 73-610.000.
Kelly, Robert C., to Upjohn Company, The. Alkenyl-substituted 9-deoxy-6,9-α-epoxymethano-PG analogs. 4,169,841, Cl. 260-345.200.
Kemp, Gordon A.: *See*—
Gustafson, Richard H.; and Kemp, Gordon A., 4,169,891, Cl. 424-181.000.
Kendra, Joseph E., to Kennametal Inc. Cutting insert. 4,169,690, Cl. 407-90.000.
Kennametal Inc.: *See*—
Kendra, Joseph E., 4,169,690, Cl. 407-90.000.
Keyes, Melvin H., to Technicon Instruments Corp. Apparatus for the quantitative determination of α-amylase. 4,169,765, Cl. 435-291.000.
Keystone International, Inc.: *See*—
Hall, David L., 4,169,543, Cl. 222-56.000.
Kharkovsky Politekhnichesky Institut: *See*—
Khimenko, Lev T.; Batkilin, Yakov M.; Legeza, Anatoly V.; and Puchkov, Mikhail I., 4,169,364, Cl. 72-56.000.
Khimenko, Lev T.; Batkilin, Yakov M.; Legeza, Anatoly V.; and Puchkov, Mikhail I., to Kharkovsky Politekhnichesky Institut. Apparatus for magnetic forming of metals. 4,169,364, Cl. 72-56.000.
Khuntia, Natabara; and Rader, Charles W., to General Motors Corporation. Disc brake service piston return spring guide pin removal. 4,169,524, Cl. 188-170.000.
Kidani, Yoshinori; and Inagaki, Kenji. Cis-platinum (II) complex of trans-l-1,2-diaminocyclohexane. 4,169,846, Cl. 260-429.00R.
Kikuchi, Mitsuo; and Hiraga, Yoichi, to Toyo Soda Manufacturing Co., Ltd. Process for removing dissolved silica from extracted phosphoric acid. 4,169,881, Cl. 423-321.00R.
Kimberly-Clark Corporation: *See*—
Werner, Edward E., 4,169,699, Cl. 425-83.100.
Kimmel, Donald S., to United States of America, Interior. Lock-out logic circuit for inverter protection. 4,170,037, Cl. 363-57.000.
Kindseth, Douglas M.: *See*—
Beacom, Thomas J.; Kindseth, Douglas M.; and Mitchell, Glen R., 4,170,039, Cl. 364-200.000.
King Industries, Inc.: *See*—
Gallacher, Lawrence V., 4,169,914, Cl. 428-290.000.
King, William R. Brake control system and apparatus for railway cars. 4,169,634, Cl. 303-22.00R.
Kingham, Lloyd. Refrigeration purge system. 4,169,356, Cl. 62-85.000.
Kirillov, Lev. P.: *See*—
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.
Kirjavainen, Alvi, to Oy, Valmet. Apparatus for damping pressure fluctuations in pulp suspension flow of paper machines. 4,169,757, Cl. 162-380.000.
Kirsch, Bernhard. Ski bindings. 4,169,612, Cl. 280-611.000.
Kirsch, Gunther: *See*—
Burg, Karlheinz; and Kirsch, Gunther, 4,169,867, Cl. 525-417.000.
Kishel, Joseph F., to Sangamo Weston, Inc. Thermal-magnetic switch. 4,169,999, Cl. 337-2.000.
Kitamura, Atsushi: *See*—
Yoshida, Kazuo; Tada, Shinsaku; and Kitamura, Atsushi, 4,169,911, Cl. 428-36.000.
Kitayama, Motozumi: *See*—
Fujio, Ryota; Kitayama, Motozumi; Odaka, Fumio; Nyomura, Takashi; and Anzai, Shiro, 4,169,599, Cl. 273-220.000.
Klatt, Kenneth G.: *See*—
Halistrom, James R.; Klatt, Kenneth G.; and Walling, Ronald L., 4,169,906, Cl. 427-183.000.
Klein, Andrew: *See*—
Barabas, Eugene S.; and Klein, Andrew, 4,169,924, Cl. 525-377.000.
Klein, Wilfried; Klink, Erich; Rudolph, Volker; and Wernicke, Friedrich, to International Business Machines Corporation. Highly integrated semiconductor structure providing a diode-resistor circuit configuration. 4,170,017, Cl. 357-15.000.
Klemann, Lawrence P.; Newman, Gerald H.; and Stogryn, Eugene L., to Exxon Research & Engineering Co. Haloorganometallic lithium salt complex compositions and electrolyte compositions containing these. 4,169,808, Cl. 252-182.100.
Klimkowski, Casimir: *See*—
Malinowski, Eugene F.; and Klimkowski, Casimir, 4,169,523, Cl. 188-71.400.
Klink, Erich: *See*—
Klein, Wilfried; Klink, Erich; Rudolph, Volker; and Wernicke, Friedrich, 4,170,017, Cl. 357-15.000.
Kluck, Erwin, to Volkswagenwerk Aktiengesellschaft. Tubular heat exchanger. 4,169,502, Cl. 165-151.000.
Kniep, Peter: *See*—
Freissmuth, Alfred; Gmoehling, Werner; Roeck, Heinrich; and Kniep, Peter, 4,169,724, Cl. 75-58.000.
Knifton, John F., to Texaco Development Corporation. Homogeneous ruthenium catalysts useful in the reduction of ortho-substituted nitroaromatics to amines. 4,169,853, Cl. 260-575.000.
Knowles, Robert G.; and Domke, Robert A., to Litton Systems, Inc. Integral low profile latch for a flat cable connector. 4,169,647, Cl. 339-99.00R.
Knox Manufacturing Co.: *See*—
Brown, Donald J., 4,169,658, Cl. 350-118.000.
Koa Oil Company, Limited: *See*—
Noguchi, Kosaku; and Komi, Nobuyuki, 4,169,767, Cl. 201-27.000.
Kobayashi, Masayoshi: *See*—
Kaibara, Nobuhiro; Yuzawa, Yasutaka; and Kobayashi, Masayoshi, 4,169,444, Cl. 123-139.0AQ.
Kobayashi, Mitsunori; Doi, Yoshihiko; Tobioka, Masaaki; and Yamamoto, Takaharu, to Sumitomo Electric Industries, Ltd. Coated tool steel and machining tool formed therefrom. 4,169,913, Cl. 428-217.000.
Kobayashi, Satoshi: *See*—
Oguro, Tomokatsu; Ishida, Yoshio; Tsuzurahara, Mamoru; and Kobayashi, Satoshi, 4,169,987, Cl. 315-39.510.
Kocher, Clemens: *See*—
Muntwyler, Rene; and Kocher, Clemens, 4,169,896, Cl. 424-325.000.
Koeneman, Paul W.; and Emanuel, Peter R., to International Telephone and Telegraph Corporation. Releasable holding means for window or screen. 4,169,617, Cl. 292-149.000.
Kohl, Karl, to Karl Mayer Textilmaschinen Fabrik GmbH. Latch opening means for warp knitting machine with latch needles. 4,169,363, Cl. 66-207.000.
Komai, Takeshi; and Matsushima, Masaru, to Nippon Oil and Fats Co., Ltd. Polymeric diacyl peroxides. 4,169,848, Cl. 260-453.0RZ.
Komi, Nobuyuki: *See*—
Noguchi, Kosaku; and Komi, Nobuyuki, 4,169,767, Cl. 201-27.000.
Komori, Shinichi: *See*—
Takeuchi, Yo; Komori, Shinichi; Toda, Kazuo; and Miyashita, Yasumasa, 4,169,728, Cl. 75-141.000.
Konig, Klaus: *See*—
Schreckenberg, Manfred; Konig, Klaus; Freitag, Dieter; and Serini, Volker, 4,169,868, Cl. 525-439.000.
Konishiroku Photo Industry Co., Ltd.: *See*—
Iytaka, Tateshi; Matsuo, Syunji; Nagatani, Toshio; Takahashi, Kazuo; and Habu, Takeshi, 4,169,733, Cl. 96-50.0PT.
Konovalenko, Evgeny D.: *See*—
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.
Korn, Stewart R.: *See*—
Boyd, Violet; Fishwick, Brian R.; Glover, Brian; Korn, Stewart R.; and Bostock, Susan M., 4,169,705, Cl. 8-41.00C.
Kornmann, Michel; Nussbaum, Marcel; and Rexer, Jurgen, to Battelle Memorial Institute. Apparatus for coating a filiform element. 4,169,426, Cl. 118-67.000.
Kosobutsky, Alexandr A.: *See*—
Chachin, Viktor N.; Sakulevich, Faddei J.; Olender, Leonty A.; Serdyaev, Grigory K.; Kosobutsky, Alexandr A.; Murkov, Oleg S.; and Sobolevsky, Vitaly P., 4,169,713, Cl. 51-7.000.
Koster, Eike: *See*—
Nix, Heinrich W.; and Koster, Eike, 4,169,653, Cl. 339-253.00R.
Koval, Stephen: *See*—
Ganz, James B.; Koval, Stephen; and Meenen, Raymond P., 4,169,344, Cl. 53-546.000.
Kraft, Inc.: *See*—
Snyder, Eugene I., 4,169,843, Cl. 260-409.000.
Krakauer, Edwin G.: *See*—
Weinzimer, Donald H.; and Krakauer, Edwin G., 4,169,307, Cl. 29-243.560.
Krautkramer-Branson, Incorporated: *See*—
Kaule, Walter; and Primbsch, Erik, 4,169,662, Cl. 350-358.000.
Kravis, David S., to Procter & Gamble Company, The. Meaty-flavored deep-fat frying compositions. 4,169,901, Cl. 426-601.000.

Kreidler, James F.: *See—*
Amstutz, O. Wendell; Dickinson, William A.; and Kreidler, James F., 4,170,027, Cl. 358-246.000.

Krempl, Peter, to Hans List. Transducer for mechanical measured variables, especially a pressure transducer. 4,169,387, Cl. 73-708.000.

Kresge, Emmett S., Sr. Root feeder. 4,169,420, Cl. 111-7.100.

Kretschmer, Sylvain; Lacotte, Jean-Pierre; and Oprandi, Pierre, to Thomson-Brandt. Apparatus and process for recording with variable correction of a television signal having three components. 4,170,022, Cl. 358-4.000.

Krotkov, Vladimir N.: *See—*
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.

Kruchen, Ernst. Method of cleaning poultry feathers. 4,169,706, Cl. 8-94.10R.

Krueger, Wallace F., to Libbey-Owens-Ford Company. Hand tool. 4,169,306, Cl. 29-239.000.

Kruse, Carl A. B.: *See—*
Danielsson, Per-Erik; Kruse, Carl A. B.; and Paabo, Michael A. X., 4,170,003, Cl. 340-146.3MA.

Kruszona, Edward G., to General Electric Company. Roller for inserting filler material in crevices. 4,169,305, Cl. 29-235.000.

Kubica, Wladyslaw; and Schmidt, Oskar. Self-supporting motor-vehicle tire. 4,169,494, Cl. 152-310.000.

Kubik, Joseph C.: *See—*
Szalay, Frank; and Kubik, Joseph C., 4,169,635, Cl. 308-136.000.

Kubota, Nobunori: *See—*
Yamana, Makoto; and Kubota, Nobunori, 4,169,350, Cl. 57-350.000.

Kugler, Hans C. Temperature measuring device for non-contacting temperature measurement. 4,169,379, Cl. 73-355.00R.

Kuhn, James O., to CPG Products Corporation. Stretchable figure exhibiting slow recovery. 4,169,336, Cl. 46-156.000.

Kulpa, Walter J., to Remington Products, Inc. Fastener for a hair roller. 4,169,482, Cl. 132-40.000.

Kummer, Rudolf; Schneider, Heinz-Walter; and Weiss, Franz-Josef, to BASF Aktiengesellschaft. Manufacture of butanedicarboxylic acid esters. 4,169,956, Cl. 560-204.000.

Kuna, Wayne A.: *See—*
Breslow, Jeffrey D.; Kuna, Wayne A.; and Jaworski, Eugene, 4,169,334, Cl. 46-103.000.

Kuo, Han C., to Olin Corporation. Protection of the low hydrogen overvoltage catalytic coatings. 4,169,775, Cl. 204-98.000.

Kurihara, Osamu: *See—*
Takeuchi, Sadatoshi; and Kurihara, Osamu, 4,169,501, Cl. 165-126.000.

Kutch, Edward F.; Meyers, Robert M.; and Sitter, Matthew M., to Norton Company, The. Hot melt sealants. 4,169,822, Cl. 260-27.0BB.

Kwasnitza, Kurt: *See—*
Horvath, Imre; Kwasnitza, Kurt; and Meyer, Gundolf, 4,169,964, Cl. 174-15.00S.

Kyowa Hakko Kogyo Co., Ltd.: *See—*
Nakayama, Kiyoshi; Araki, Kazumi; and Tanaka, Yoshitake, 4,169,763, Cl. 435-115.000.

L.T.D. Enterprises, Inc.: *See—*
Logan, Gerald A., 4,169,608, Cl. 280-153.00R.

Lach, Robert E.: *See—*
Loofbourow, Donald I.; and Lach, Robert E., 4,169,667, Cl. 352-159.000.

Lacotte, Jean-Pierre: *See—*
Kretschmer, Sylvain; Lacotte, Jean-Pierre; and Oprandi, Pierre, 4,170,022, Cl. 358-4.000.

Lafon, Pierre: *See—*
Descoins, Daniel; Portes, Alain; and Lafon, Pierre, 4,169,879, Cl. 422-220.000.

Lai, Peter; Szymanski, Stanley; and Christensen, Norman L., to Hooker Chemicals & Plastics Corp. Removal of chlorate from electrolytic cell anolyte. 4,169,773, Cl. 204-98.000.

Lamberti, Vincent; and Gutierrez, Eddie N., to Lever Brothers Company. Carboxymethyloxysuccinic anhydride and acid halide thereof. 4,169,842, Cl. 260-346.740.

Lamberti, Vincent; and Gutierrez, Eddie N., to Lever Brothers Company. Amides of carboxymethyloxysuccinic acid. 4,169,957, Cl. 562-564.000.

Lampatzer, Karl; and Rausch, Werner, to Oxy Metal Industries Corporation. Method for the surface treatment of metals. 4,169,741, Cl. 148-6.160.

Landauer, Franz, to Hoechst Aktiengesellschaft. Process for the preparation of N-(chloroaryl)-N',N'-dialkylamidines. 4,169,852, Cl. 260-564.0RF.

Lang, Stanley A., Jr.; and Walworth, Bryant L., to American Cyanamid Company. Pyrazolyltriazole herbicides. 4,169,838, Cl. 548-262.000.

Lange, Wolfgang: *See—*
Gerlach, Klaus; and Lange, Wolfgang, 4,169,827, Cl. 260-45.75R.

Langford, Obie M.: *See—*
Arnold, Dan M.; Langford, Obie M.; Paap, Hans J.; and Scott, Hubert D., 4,169,979, Cl. 250-266.000.

Larson, Curtis A.: *See—*
Beuch, Wallace E.; Larson, Curtis A.; Zell, Michael N.; and Fournier, Thomas R., 4,170,031, Cl. 360-98.000.

Larsson, Lars-Goran; and Murne, Bertil S. O., to Aktiebolaget Platmanufaktur. Packaging container. 4,169,540, Cl. 220-462.000.

Larsson, Torsten O.: *See—*
Lewkowicz, Josef; and Larsson, Torsten O., 4,169,520, Cl. 184-7.00D.

Laska, Harry M.; and Grimm, Nelson, to General Electric Company. Method of producing a tubular body of polycrystalline alumina. 4,169,875, Cl. 264-63.000.

Laskey, Norman V. Marine shunter. 4,169,423, Cl. 114-248.000.

Lattmann, Werner; and Wildbolz, Rudolf, to Rieter Machine Works, Limited. Pneumatic system for feeding a plurality of cards with open fiber flocks. 4,169,632, Cl. 406-93.000.

Latz, Fred E.; and Berkbigler, Kenneth A., to ACF Industries, Inc. Carburetor. 4,169,872, Cl. 261-52.000.

Lauterbach, Gunter: *See—*
Schacht, Erich; Lauterbach, Gunter; Mehrhof, Werner; Curtze, Jurgen; Linden, Gerbert; Lust, Siegmund; and Thomas, Klaus, 4,169,720, Cl. 71-108.000.

Lear Siegler, Inc.: *See—*
Murphy, Randall T.; and Keane, Thomas H., 4,169,627, Cl. 297-452.000.

Leblanc, Marc; and Lepretre, Bernard, to Regie Nationale des Usines Renault. Digital computer for calculating the optimal richness of the air/fuel mixture for internal combustion engines. 4,170,040, Cl. 364-442.000.

Le Comber, Peter G.: *See—*
Kalbitzer, Siegfried; Muller, Gerhard; Spear, Walter E.; and Le Comber, Peter G., 4,169,740, Cl. 148-1.500.

Lee, Daeyong, to General Electric Company. Zirconium-base alloy nuclear fuel container and method. 4,169,743, Cl. 148-32.000.

Lee, Hop. Electric plug with novel means connecting wires to terminals. 4,169,640, Cl. 339-14.00P.

LeFrois, Richard T., to Honeywell Inc. Solar energy heat utilization. 4,169,499, Cl. 165-1.000.

Legeza, Anatoly V.: *See—*
Khimenko, Lev T.; Batkilin, Yakov M.; Legeza, Anatoly V.; and Puchkov, Mikhail I., 4,169,364, Cl. 72-56.000.

Legrand, Marie G. J. Tunneling machine with plural adjustable arms carrying single cutter. 4,169,629, Cl. 299-61.000.

Lehmann, Karl-Heinz; and Artzt, Peter, to Schubert & Salzer. Yarn guide for use in winding yarn on a package. 4,169,564, Cl. 242-157.00R.

Leiber, Wolfgang: *See—*
Hirt, Manfred; and Leiber, Wolfgang, 4,169,519, Cl. 184-6.300.

Lemelson, Jerome H. Fastening materials. 4,169,303, Cl. 24-204.000.

Lenhardt, Albert P.: *See—*
Haug, Henry W.; Shon, Gary M.; and Lenhardt, Albert P., 4,169,461, Cl. 126-437.000.

Lepretre, Bernard: *See—*
Leblanc, Marc; and Lepretre, Bernard, 4,170,040, Cl. 364-442.000.

Lerat, Henry, to Permo SA. Process and apparatus for purifying sea water by reverse osmosis. 4,169,789, Cl. 210-22.00D.

Lerdman, David M., to General Electric Company. Electronically commutated motor. 4,169,990, Cl. 318-138.000.

Leu, Erwin, to Maschinenfabrik Schweiter AG. Thread draw-off device. 4,169,563, Cl. 242-35.60E.

Lever Brothers Company: *See—*
Lamberti, Vincent; and Gutierrez, Eddie N., 4,169,842, Cl. 260-346.740.
Lamberti, Vincent; and Gutierrez, Eddie N., 4,169,957, Cl. 562-564.000.

Levin, Michael M.: *See—*
Elliano, Jack L.; and Levin, Michael M., 4,170,015, Cl. 346-76.0PH.

Levitt, George, to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,169,719, Cl. 71-92.000.

Lewkowicz, Josef; and Larsson, Torsten O., to Atlas Copco AB. Method and system of lubricating a plurality of compressed air operated devices. 4,169,520, Cl. 184-7.00D.

Liautaud, Jacques: *See—*
Plan, Robert; Liautaud, Jacques; Makula, Marie-France; Gattel, Paule; Pla, Jean; and Debrus, Andre, 4,169,829, Cl. 260-122.000.

Libbey-Owens-Ford Company: *See—*
Krueger, Wallace F., 4,169,306, Cl. 29-239.000.

Liberty Furniture Industries Limited: *See—*
Frieberg, Murray, 4,169,573, Cl. 248-188.000.

Lichtenstein, Arthur L.; Petruzzi, Vincent; and Anderson, Michael P. Adjustable automotive and aircraft sun visor extension. 4,169,552, Cl. 296-97.00C.

Lindberg, Ramon E.: *See—*
Bonigut, Josef; Lindberg, Ramon E.; and Darm, Peter K., 4,169,484, Cl. 134-167.00R.

Linde Aktiengesellschaft: *See—*
Baldus, Wolfgang, 4,169,361, Cl. 62-402.000.

Linden, Gerbert: *See—*
Schacht, Erich; Lauterbach, Gunter; Mehrhof, Werner; Curtze, Jurgen; Linden, Gerbert; Lust, Siegmund; and Thomas, Klaus, 4,169,720, Cl. 71-108.000.

Lindmayer, Joseph, to Semix, Incorporated. Method of making silicon-impregnated foraminous sheet by partial immersion and capillary action. 4,169,739, Cl. 148-1.500.

Linke, Horst: *See—*
Weirich, Walter; Dettmers, Michael; Rassmann, Christoph; Heyer, Willi; Beyer, Herbert; and Linke, Horst, 4,169,689, Cl. 405-291.000.

Lipert, Peter, to Aero-Hydraulics Corporation. Fluid circulating device. 4,169,873, Cl. 261-121.00R.

Liqui-Box Corporation: *See—*
Bond, Curtis J., 4,169,548, Cl. 222-505.000.

Littlefield, John B., to AMSTED Industries Incorporated. Method and apparatus for making composition friction materials. 4,169,680, Cl. 366-139.000.

Litton Systems, Inc.: *See*—
Knowles, Robert G.; and Domke, Robert A., 4,169,647, Cl. 339-99.00R.

Lockshaw, James J., to Tolo, Incorporated. Tank drain assembly for swimming pool filters. 4,169,793, Cl. 210-169.000.

Lockwood International B.V.: *See*—
Douwenga, Rudolf, 4,169,345, Cl. 53-570.000.

Lofy, Richard A.: *See*—
Blackstone, Eugene G.; Lofy, Richard A.; and Williams, Lawrence P., 4,169,758, Cl. 176-19.00R.

Logan, Gerald A., to L.T.D. Enterprises, Inc. Fender extensions. 4,169,608, Cl. 280-153.00R.

Logan, Ralph A.; and Tsang, Won-Tien, to Bell Telephone Laboratories, Incorporated. Lateral current confinement in junction lasers. 4,169,997, Cl. 331-94.50H.

Loofbourow, Donald I.; and Lach, Robert E., to GAF Corporation. Film buffer for motion picture projectors. 4,169,667, Cl. 352-159.000.

Lourenco, Manuel J.: *See*—
Clark, Samuel K.; and Lourenco, Manuel J., 4,169,373, Cl. 73-146.000.

Lowery, Richard K.; and Willis, William J., to R. O. Hull & Company, Inc. Acid zinc plating baths, compositions useful therein, and methods for electrodepositing bright zinc deposits. 4,169,772, Cl. 204-55.00R.

Lowman, Carl W., to Alpha Nova Engineering Corp. Combination garden tool with removable weight. 4,169,509, Cl. 172-375.000.

Luais, Jean-Paul: *See*—
Bouvier, Claude J.; Smithson, David J.; and Luais, Jean-Paul, 4,170,038, Cl. 364-200.000.

Lucas Industries Limited: *See*—
Hodge, Peter C.; and May, William S., 4,169,448, Cl. 123-179.00H.

Lundberg, Robert D.: *See*—
Bock, Jan; Lundberg, Robert D.; and Makowski, Henry S., 4,169,820, Cl. 260-23.50A.

Luque, Antonio. Double-sided solar cell with self-refrigerating concentrator. 4,169,738, Cl. 136-89.0PC.

Luria, David, to Panel Laboratories Ltd. Method and apparatus for diagnosing the condition of oil-wetted parts. 4,169,677, Cl. 356-70.000.

Lust, Siegmund: *See*—
Schacht, Erich; Lauterbach, Gunter; Mehrhof, Werner; Curtze, Jurgen; Linden, Gerbert; Lust, Siegmund; and Thomas, Klaus, 4,169,720, Cl. 71-108.000.

Lutz, Bruce L.; and Buller, Richard J., to Hesston Corporation. Stack-forming machine having spring-powered, press-controlled tailgate. 4,169,411, Cl. 100-255.000.

Lynch, Thomas J.: *See*—
Gilbert, Ronald E.; Lynch, Thomas J.; and Rowatt, Robert J., 4,169,826, Cl. 260-33.6PQ.
Hill, Robert W.; Lynch, Thomas J.; and Wisneski, Peter M., 4,169,927, Cl. 526-124.000.

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Plan, Robert; Liautaud, Jacques; Makula, Marie-France; Gattel, Paule; Pla, Jean; and Debrus, Andre, 4,169,829, Cl. 260-122.000.

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Flanner, Philip D.; and Malcom, George G., 4,169,384, Cl. 73-516.00R.

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Vargiu, Silvio; Manzoni, Pier L.; Bernasconi, Mario; and Parodi, Antonio, 4,169,937, Cl. 525-493.000.

Mar, Alfred C. Knife with interchangeable blades. 4,169,312, Cl. 30-337.000.

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Burke, Oliver W., Jr., deceased; and Humphreys, Victor T., 4,169,737, Cl. 106-308.00M.

Markenson, Jacob: *See*—
Hertman, Israel; Michael, Ammon; and Markenson, Jacob, 4,169,886, Cl. 424-92.000.

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Hanka, Ladislav J.; and Martin, David G., 4,169,888, Cl. 424-121.000.

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Creutz, Hans-Gerhard, deceased; Herr, Roy W.; and Martin, Sylvia, 4,169,771, Cl. 204-55.00R.

Maruyama, Yutaka: *See*—
Shiroki, Masami; Maruyama, Yutaka; and Goto, Kazuhiro, 4,169,899, Cl. 424-246.000.

Marvin Glass & Associates: *See*—
Breslow, Jeffrey D.; Kuna, Wayne A.; and Jaworski, Eugene, 4,169,334, Cl. 46-103.000.

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Leu, Erwin, 4,169,563, Cl. 242-35.60E.

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Clarke, John T.; Harker, Royce K.; Hittmeier, Michael E.; and Eaton, James W., 4,169,748, Cl. 156-62.200.

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Todeschini, Eugenio, 4,169,443, Cl. 123-139.00R.

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Matra-Tech Thermal & Acoustic Services Limited: *See*—
Watson, Timothy J., 4,169,340, Cl. 52-774.000.

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Hiratake, Susumu; and Matsui, Mitsuhiro, 4,169,962, Cl. 13-2.00P.

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Matsushima, Masaru: *See*—
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Yokoyama, Kazuo; Nishiyama, Ryuji; and Yonezawa, Taketoshi, 4,170,032, Cl. 360-120.000.

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Slater, Dan; Gale, John C.; and Matza, Joseph L., 4,169,666, Cl. 352-85.000.

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Guyot, Volker; Maus, Otfrid; and Mueller, Martin, 4,169,383, Cl. 73-462.000.

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Kalbitzer, Siegfried; Muller, Gerhard; Spear, Walter E.; and Le Comber, Peter G., 4,169,740, Cl. 148-1.500.

May, William S.: *See*—
Hodge, Peter C.; and May, William S., 4,169,448, Cl. 123-179.00H.

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Garvey, Louis P.; Bobak, John G.; and Maye, Robert A., 4,169,574, Cl. 248-429.000.

McArdle, Edward J., to Illinois Tool Works Inc. Multipackaging method and apparatus. 4,169,343, Cl. 53-398.000.

McArthur, James A. Leg exercising apparatus. 4,169,589, Cl. 272-118.000.

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McCracken, James H. Portable security lock. 4,169,619, Cl. 292-290.000.

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Jackson, Robert V.; and Anderson, Harold F., deceased, 4,169,446, Cl. 123-148.0CC.

McCulloch, John R. Eyeglass bow construction. 4,169,665, Cl. 351-123.000.

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McDonald, Raymond F., to J. I. Case Company. Self-energizing friction drive transmission. 4,169,392, Cl. 74-197.000.

McDonald, Robert E.: *See*—
Yapp, William J.; and McDonald, Robert E., 4,169,825, Cl. 260-31.600.
McDonough, Edward C.; and Tuley, Eugene N., to General Electric Company. Variable area turbine nozzle and means for sealing same. 4,169,692, Cl. 415-115.000.
McGill, Robert W.: *See*—
Horak, Alan A.; O'Donnell, Richard T.; McGill, Robert W.; and Bianchi, David L., 4,169,621, Cl. 294-116.000.
McKee, Walter L., to Henderson Mfg. Co. Distributor for particulate material. 4,169,559, Cl. 239-672.000.
McLaughlin, Ivan P.: *See*—
Barker, John C.; and McLaughlin, Ivan P., 4,169,907, Cl. 427-264.000.
McMahan, Walter C. Agricultural water pressure gauge. 4,169,386, Cl. 73-700.000.
Meenen, Raymond P.: *See*—
Ganz, James B.; Koval, Stephen; and Meenen, Raymond P., 4,169,344, Cl. 53-546.000.
Mefina S.A.: *See*—
Fresard, Marcel, 4,169,353, Cl. 60-592.000.
Meginnis, Charles E. Method of making a sight glass assembly. 4,169,309, Cl. 29-447.000.
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Schacht, Erich; Lauterbach, Gunter; Mehrhof, Werner; Curtze, Jurgen; Linden, Gerbert; Lust, Siegmund; and Thomas, Klaus, 4,169,720, Cl. 71-108.000.
Meigs, Robert W., to Phillips Petroleum Company. Drilling and belling apparatus. 4,169,510, Cl. 175-65.000.
Meiji Seika Kaisha, Ltd.: *See*—
Amano, Shoichi; Miyadoh, Shinji; Itoh, Mitsugu; Ezaki, Norio; Akita, Eiichi; and Yamada, Yujiro, 4,169,889, Cl. 424-122.000.
Miyazawa, Takeo; Horiuchi, Yukio; Akita, Eiichi; Umezawa, Hamao; and Umezawa, Sumio, 4,169,890, Cl. 424-180.000.
Melitta-Werke Bentz & Sohn KG: *See*—
Hauslein, Reinhard, 4,169,978, Cl. 219-297.000.
Menard, Marcel; and Caron, Gilles, to Bristol-Myers Company. Novel phosphorane intermediates for use in preparing penem antibiotics. 4,169,833, Cl. 260-239.00A.
Mencacci, Samuel A., to FMC Corporation. Continuous pressure cooker and cooler with controlled liquid flow. 4,169,408, Cl. 99-355.000.
Mercer, Roger W.; and Hay, Louis E. Dental articulator for mounting casts without plaster. 4,169,314, Cl. 32-32.000.
Merck & Co., Inc.: *See*—
Baldwin, John J.; and Ponticello, Gerald S., 4,169,835, Cl. 548-213.000.
Gal, George; and Pines, Seemon H., 4,169,858, Cl. 260-590.00R.
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Merk, Peter: *See*—
Fleck, Fritz; Hervot, Emmanuel; Merk, Peter; Schmid, Horst; and Wiedemann, Achim, 4,169,702, Cl. 8-1.00W.
Merten, Rudolf: *See*—
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Mettoy Company Limited, The: *See*—
Crane, John C., 4,169,594, Cl. 273-58.0BA.
Meyer AG Zuchwil: *See*—
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Meyer-Bretschneider, Thomas J. Device serving the noise control of sound energy radiated from the jet engines of an aircraft operated on the ground in stationary position. 4,169,517, Cl. 181-210.000.
Meyer, Donald R.; Sill, Arthur D.; and Tiernan, Paul L., to Richardson-Merrell Inc. 2,7-Bis-basic ethers of 9-phenanthrol and 9-loweralkoxy phenanthrol. 4,169,897, Cl. 424-330.000.
Meyer, Gundolf: *See*—
Horvath, Imre; Kwasnitza, Kurt; and Meyer, Gundolf, 4,169,964, Cl. 174-15.00S.
Meyers, Robert M.: *See*—
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Michael, Ammon: *See*—
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Mickelic, Raymond J.: *See*—
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Midland-Ross Corporation: *See*—
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Midwest Biochemical Corporation: *See*—
Weber, Meyer M., 4,169,817, Cl. 252-545.000.
Miffitt, Donald C.; and Tortola, Angelo, to Gillette Company, The. Electronically controlled exercising machine. 4,169,588, Cl. 272-70.000.
Milenius, David L., to Abtec Chemical Company. Low gloss ABS extrusion compositions. 4,169,869, Cl. 525-87.000.
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Ryer, Jack; Zielinski, James; Miller, Harold N.; and Brois, Stanley J., 4,169,836, Cl. 548-238.000.
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Miller, Stephen J., to Chevron Research Company. Denitrification by furfural-ferric chloride extraction of coker oil. 4,169,781, Cl. 208-97.000.
Miller Tilt-Top Trailer, Inc.: *See*—
Moll, Jack E., 4,169,579, Cl. 254-45.000.
Miller, Walter L. Dispenser for cup holders. 4,169,542, Cl. 221-303.000.
Milne, James, to Balfour Beatty Limited. Artificial and natural structures impregnated by using a flexible, fluid impermeable covering. 4,169,909, Cl. 427-294.000.
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Kahn, Donald D., 4,170,029, Cl. 360-96.100.
Yapel, Anthony F., Jr., 4,169,804, Cl. 252-62.530.
Minogue, Robert W., to Federal Signal Corporation. Sign mounting method. 4,169,308, Cl. 29-407.000.
Miranti, Joseph P., Jr.: *See*—
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Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
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Takeuchi, Yo; Komori, Shinichi; Toda, Kazuo; and Miyashita, Yasumasa, 4,169,728, Cl. 75-141.000.
Miyadoh, Shinji: *See*—
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Miyamoto, Norioki; and Inoue, Shigeo, to Kao Soap Co., Ltd. β-Sulfenyl acrylic acid compounds and process of preparing same. 4,169,850, Cl. 260-561.00S.
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Takeuchi, Yo; Komori, Shinichi; Toda, Kazuo; and Miyashita, Yasumasa, 4,169,728, Cl. 75-141.000.
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Mobil Oil Corporation: *See*—
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Mochida, Kenichi; and Mori, Yasuki, to Abbott Laboratories. Fortimicin derivatives and method for production thereof. 4,169,942, Cl. 536-17.00R.
Moist, Stanford C., Jr., to AMP Incorporated. Strain relief and back cover for electrical connector. 4,169,648, Cl. 339-103.00R.
Moll, Jack E., to Miller Tilt-Top Trailer, Inc. Truck trailer tongue stand. 4,169,579, Cl. 254-45.000.
Monsanto Company: *See*—
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Morgan, Albert W.: *See*—
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Morton, Ray H.: *See—*
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Muggli, Robert Z. Method and apparatus for gas analysis. 4,169,708, Cl. 23-232.00E.

Muller, Gerhard: *See—*
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Murtha, Timothy P., to Phillips Petroleum Company. Separation of cyclohexylbenzene-cyclohexanone-phenol-containing mixtures by hydrogenation and distillation. 4,169,857, Cl. 260-586.00P.

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Nalco Chemical Company: *See—*
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Payne, Charles C., 4,169,337, Cl. 51-283.00R.
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National Patent Development Corporation: *See—*
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Nestler, Heinz: *See—*
Schonafinger, Eduard; Deigner, Paul; Ohlinger, Manfred; Jakusch, Helmut; Amort, Jurgen; Nestler, Heinz; Seiler, Claus-Dietrich; and Ambros, Otto, 4,169,912, Cl. 428-145.000.

Neumunstersche Maschinen- und Apparatebau Gesellschaft mbH: *See—*
Vehling, Ernst; and Ratjen, Johann, 4,169,397, Cl. 83-100.000.

New Ideas, Inc.: *See—*
Cirasuolo, Edward; and Cirasuolo, Rocco, 4,169,638, Cl. 312-229.000.

Newby, Maurice P.; and Rainey, Roderick C. T., to Yarrow and Company Limited. Tension leg buoyancy structure. 4,169,424, Cl. 114-265.000.

Newell, Robert E., to Glaxo Laboratories Limited. Ointment container with finger actuated piston. 4,169,547, Cl. 222-386.000.

Newkirk, Richard V.: *See—*
Drew, Gene R.; Gylseth, Herman M.; Van Buskirk, William O.; and Newkirk, Richard V., 4,169,568, Cl. 244-148.000.

Newman, Gerald H.: *See—*
Klemann, Lawrence P.; Newman, Gerald H.; and Stogryn, Eugene L., 4,169,808, Cl. 252-182.100.

Nichols, John A., to Airtech Systems, Inc. Waste heat recycling system. 4,169,321, Cl. 34-23.000.

Nielsen, Hilmer R. Additive for grouts, its preparation and use. 4,169,736, Cl. 106-93.000.

Nielsen, Richard H.; and Dale, Glenn H., to Phillips Petroleum Company. Catalytic cracking process using a passivation agent and an oxidation promoter. 4,169,784, Cl. 208-113.000.

Niggemeyer, Gerd G. Rotary piston internal combustion engine and method for influencing its operation. 4,169,451, Cl. 123-202.000.

Nihon Senshoku Kikai Kabushiki Kaisha: *See—*
Kato, Sei, 4,169,681, Cl. 366-244.000.

Nilsson, Daniel G.: *See—*
Murphy, Charles R., 4,169,310, Cl. 29-751.000.

Nippon Kogaku K.K.: *See—*
Nakamura, Soichi, 4,169,660, Cl. 350-176.000.

Nippon Oil and Fats Co., Ltd.: *See—*
Komai, Takeshi; and Matsushima, Masaru, 4,169,848, Cl. 260-453.0RZ.

Nippon Soken, Inc.: *See—*
Iwase, Kazuo; and Katsuoka, Ritsu, 4,169,438, Cl. 123-117.00D.

Nippon Steel Corporation: *See—*
Yoshioka, Kengo; Nozato, Teruichi; Uchiyama, Haruki; Satoh, Akira; Inoue, Shigeo; Togino, Yuji; Mori, Keisuke; and Satou, Ituro, 4,169,700, Cl. 431-174.000.

Nishimoto, Takashi; Suzuki, Seiichi; and Takamori, Hiroyoshi, to Kabushiki Kaisha Fujikoshi. Shaft sealing means for high pressure fluid. 4,169,605, Cl. 277-188.00A.

Nishiyama, Ryuji: *See—*
Yokoyama, Kazuo; Nishiyama, Ryuji; and Yonezawa, Taketoshi, 4,170,032, Cl. 360-120.000.

Nix, Heinrich W.; and Koster, Eike, to AMP Incorporated. Electrical terminal. 4,169,653, Cl. 339-253.00R.

Noguchi, Kosaku; and Komi, Nobuyuki, to Koa Oil Company, Limited. Process for calcining coke. 4,169,767, Cl. 201-27.000.

Nomura, Katsuhiko, to Asahi Kogaku Kogyo Kabushiki Kaisha. Device for indicating the completion of winding of the shutter of a camera. 4,169,670, Cl. 354-289.000.

Nomura, Susumu: *See—*
Endo, Tadakazu; Nomura, Susumu; Matsumoto, Masato; and Takahashi, Kojiro, 4,169,669, Cl. 353-95.000.

Nopa GmbH: *See—*
Hanke, Wolfgang, 4,169,651, Cl. 339-217.00R.

Nordling, Neal F., to Cardiac Pacemakers, Inc. Crystal oscillator and divider. 4,169,994, Cl. 328-41.000.

Norman, Lloyd E., to Texas Instruments Incorporated. Printer mechanism. 4,169,682, Cl. 400-120.000.

Norris Industries: *See—*
Potter, Dennis G.; Dietrich, Hagen; and Potschka, Joseph, 4,169,618, Cl. 292-169.150.

Norton Company, The: *See—*
Kutch, Edward F.; Meyers, Robert M.; and Sitter, Matthew M., 4,169,822, Cl. 260-27.0BB.

Noshiro, Atsumi; Obata, Hiroyuki; Takamizawa, Minoru; and Inoue, Yoshio, to Dai Nippon Printing Co. Ltd; and Shin-Etsu Chemical Co. Ltd. Method for the preparation of a planographic printing plate. 4,169,731, Cl. 96-1.00R.

Novosel, Gerald W.: *See—*
Davis, Jerry E.; Mueller, Frank J.; and Novosel, Gerald W., 4,169,806, Cl. 252-99.000.

Nozato, Teruichi: *See—*
Yoshioka, Kengo; Nozato, Teruichi; Uchiyama, Haruki; Satoh, Akira; Inoue, Shigeo; Togino, Yuji; Mori, Keisuke; and Satou, Ituro, 4,169,700, Cl. 431-174.000.

NRM Corporation: *See—*
Turk, Leonard G.; Yuhas, Gerald J.; and Cantarutti, Armindo, 4,169,698, Cl. 425-28.00P.

Nupponen, Heikki E.: *See—*
Maki, Juhani I. T.; Malkonen, Pentti J.; and Nupponen, Heikki E., 4,169,840, Cl. 260-343.210.

Nussbaum, Marcel: *See—*
Kornmann, Michel; Nussbaum, Marcel; and Rexer, Jurgen, 4,169,426, Cl. 118-67.000.

Nusslein, Ludwig; and Arndt, Friedrich, to Schering Aktiengesellschaft. 2-(Dimethylcarbamoylimino)-1,3,4-thiadiazolin-3-carboxylic acid esters and herbicides containing the same. 4,169,718, Cl. 71-90.000.

Nutt, Geoffrey W.: *See—*
Henley, Anthony J. R.; and Nutt, Geoffrey W., 4,169,649, Cl. 339-176.00M.

Nyomura, Takashi: *See—*
Fujio, Ryota; Kitayama, Motozumi; Odaka, Fumio; Nyomura, Takashi; and Anzai, Shiro, 4,169,599, Cl. 273-220.000.

Obata, Hiroyuki: *See—*
Noshiro, Atsumi; Obata, Hiroyuki; Takamizawa, Minoru; and Inoue, Yoshio, 4,169,731, Cl. 96-1.00R.

Oberkirch, Wolfgang: *See—*
von Bonin, Wulf; Oberkirch, Wolfgang; and von Gizycki, Ulrich, 4,169,866, Cl. 525-131.000.

Obrez, Ivo, to Cordis Corporation. Catheter for selective catheterization of aortic branches. 4,169,464, Cl. 128-657.000.

Oce-Andeno B.V.: *See—*
Houbiers, Joannes P. M.; and Thijssen, Francina H. J., 4,169,839, Cl. 549-81.000.

Odaka, Fumio: *See—*
Fujio, Ryota; Kitayama, Motozumi; Odaka, Fumio; Nyomura, Takashi; and Anzai, Shiro, 4,169,599, Cl. 273-220.000.

O'Donnell, Richard T.: *See—*
Horak, Alan A.; O'Donnell, Richard T.; McGill, Robert W.; and Bianchi, David L., 4,169,621, Cl. 294-116.000.

Oeschger, Frank A.: *See—*
Roetter, Francis T.; Oeschger, Frank A.; and Pearson, Charles B., 4,169,341, Cl. 53-154.000.

Ogasawara, Kaoru: *See—*
Tange, Fumiko, 4,169,346, Cl. 53-583.000.

Oguro, Tomokatsu; Ishida, Yoshio; Tsuzurahara, Mamoru; and Kobayashi, Satoshi, to Hitachi, Ltd. Magnetron tubes cathode support. 4,169,987, Cl. 315-39.510.

Ohio Medical Instrument Company, Inc.: *See—*
Hickmann, Horst R., 4,169,478, Cl. 128-346.000.

Ohlinger, Manfred: *See—*
Schonafinger, Eduard; Deigner, Paul; Ohlinger, Manfred; Jakusch, Helmut; Amort, Jurgen; Nestler, Heinz; Seiler, Claus-Dietrich; and Ambros, Otto, 4,169,912, Cl. 428-145.000.

Ohsugi, Motoyoshi: *See—*
Aigami, Koji; Inamoto, Yoshiaki; Ohsugi, Motoyoshi; Fujikura, Yoshiaki; and Takaishi, Naotake, 4,169,953, Cl. 560-117.000.

Ohta, Kozo: *See—*
Ishikawa, Masaru; Katagiri, Nagatoshi; Enoki, Shigenaga; and Ohta, Kozo, 4,169,512, Cl. 180-205.000.

Ohumi, Takeharu: *See—*
Inada, Masami; and Ohumi, Takeharu, 4,169,489, Cl. 137-545.000.

Oil Recovery Corporation: *See—*
Scott, Harold W., 4,169,503, Cl. 166-65.00R.

Ojala, Tapani M.: *See—*
Jauros, Ensi A.; and Ojala, Tapani M., 4,169,508, Cl. 169-47.000.

Olender, Leonty A.: *See—*
Chachin, Viktor N.; Sakulevich, Faddei J.; Olender, Leonty A.; Serdyaev, Grigory K.; Kosobutsky, Alexandr A.; Murkov, Oleg S.; and Sobolevsky, Vitaly P., 4,169,713, Cl. 51-7.000.

Olin Corporation: *See—*
Kadija, Igor V.; and Patel, Harshad M., 4,169,774, Cl. 204-98.000.
Kuo, Han C., 4,169,775, Cl. 204-98.000.
Popplewell, James M.; Acton, Constance F.; and Brock, Andrew J., 4,169,729, Cl. 75-154.000.

Olsen, Richard J.; Brinkley, Max D.; and Thiele, John R., to Goodyear Tire & Rubber Company, The. Centering a tire in a mold. 4,169,877, Cl. 264-315.000.

Olsson, Billy E., to AMP Incorporated. Connector clip for flat cable. 4,169,641, Cl. 339-17.00F.

Omura, Hitoshi: *See—*
Tsutsui, Nobuyuki; Omura, Hitoshi; Mizobe, Takashi; Kanda, Katsumi; and Fujimoto, Terunori, 4,169,916, Cl. 428-447.000.

Onizuka, Shigenori: *See—*
Inaba, Hideya; Kamino, Yasumi; Onizuka, Shigenori; and Inazumi, Chikashi, 4,169,814, Cl. 252-441.000.

Opiela, Michael L.; and Zelazny, Stanley D. Memorial audio reproduction system. 4,169,970, Cl. 179-100.10C.

Oprandi, Pierre: *See—*
Kretschmer, Sylvain; Lacotte, Jean-Pierre; and Oprandi, Pierre, 4,170,022, Cl. 358-4.000.

Otteman, John H.; and Gray, William M. Gas supply system with purge means. 4,169,486, Cl. 137-240.000.

Outokumpu Oy: *See—*
Makipirtti, Simo A. I., 4,169,725, Cl. 75-74.000.

Owatonna Tool Company: *See—*
Stelmasik, Gregory A.; and Anderson, Richard T., 4,169,412, Cl. 100-257.000.

Owens-Illinois, Inc.: *See—*
Ernsthausen, Roger E.; Fein, Michael E.; and Byrum, Bernard W., Jr., 4,169,985, Cl. 313-218.000.
Jones, James C., 4,169,823, Cl. 260-29.6NR.

Oxy Metal Industries Corporation: *See—*
Creutz, Hans-Gerhard, deceased; Herr, Roy W.; and Martin, Sylvia, 4,169,771, Cl. 204-55.00R.
Lampatzer, Karl; and Rausch, Werner, 4,169,741, Cl. 148-6.160.

Oy Star AB: *See—*
Maki, Juhani I. T.; Malkonen, Pentti J.; and Nupponen, Heikki E., 4,169,840, Cl. 260-343.210.

Oy, Valmet: *See—*
Kirjavainen, Alvi, 4,169,757, Cl. 162-380.000.

Paabo, Michael A. X.: *See—*
Danielsson, Per-Erik; Kruse, Carl A. B.; and Paabo, Michael A. X., 4,170,003, Cl. 340-146.3MA.

Paap, Hans J.: *See—*
Arnold, Dan M.; Langford, Obie M.; Paap, Hans J.; and Scott, Hubert D., 4,169,979, Cl. 250-266.000.

Packaging Components Industries, Inc.: *See—*
Wood, Clifford A., 4,169,531, Cl. 206-531.000.

Pacura, Nick. Car door lock control. 4,169,620, Cl. 292-347.000.

Panel Laboratories Ltd.: *See—*
Luria, David, 4,169,677, Cl. 356-70.000.

Paoletti, Rodolfo: *See—*
Ferruti, Paolo; and Paoletti, Rodolfo, 4,169,923, Cl. 525-279.000.

Papanu, Victor D., to Monsanto Company. Copolymers of keto dicarboxylates. 4,169,934, Cl. 525-418.000.

Parisi, Tulio, to Contract Systems Associates, Inc. Ultrasonic probe. 4,169,984, Cl. 310-323.000.

Parker, Norman W., to Motorola, Inc. Noise protection circuit for AM stereo cosine correction factor. 4,169,968, Cl. 179-1.0GS.

Parodi, Antonio: *See—*
Vargiu, Silvio; Manzoni, Pier L.; Bernasconi, Mario; and Parodi, Antonio, 4,169,937, Cl. 525-493.000.

Patel, Harshad M.: *See—*
Kadija, Igor V.; and Patel, Harshad M., 4,169,774, Cl. 204-98.000.

Paufler, Frederick J. Trailer alignment device. 4,169,610, Cl. 280-477.000.

Paul N. Gardner Company: *See—*
Gardner, Paul N., 4,169,319, Cl. 33-169.00F.

Payne, Charles C., to Nalco Chemical Company. Process for polishing semi-conductor materials. 4,169,337, Cl. 51-283.00R.

Payne, Frank: *See—*
Smith, William N.; and Payne, Frank, 4,169,971, Cl. 200-67.00B.

Pearson, Charles B.: *See—*
Roetter, Francis T.; Oeschger, Frank A.; and Pearson, Charles B., 4,169,341, Cl. 53-154.000.

Peder Smedvig Shipowners: *See—*
Wipkink, Johannes; and Johansen, Harald, 4,169,296, Cl. 14-71.100.

Pedersen, Einar, to Pedersen, Einar. Apparatus for the application, positioning and adjustment of sections in the assembly of panels. 4,169,977, Cl. 219-125.100.

Peers-Trevarton, Charles A., to AMF Incorporated. Push operated momentary switch. 4,169,974, Cl. 200-276.000.

Peluso, Philip J.: *See—*
Kellogg, Seeley C.; Peluso, Philip J.; and Bernardi, Richard B., 4,169,385, Cl. 73-610.000.

Penn-Plax Plastics, Inc.: *See—*
DiMarchi, Silvio J.; Goldman, Marvin A.; Gilmore, Arthur; and Goldman, Jerome N., 4,169,378, Cl. 73-353.000.
Goldman, Marvin A.; Goldman, Jerome N.; Gilmore, Arthur; and DiMarchi, Silvio J., 4,169,382, Cl. 73-376.000.

Permo SA: *See—*
Lerat, Henry, 4,169,789, Cl. 210-22.00D.

Perrotta, Kenneth A., to Whatman Reeve Angel Limited. Filter tube and method of preparing same. 4,169,754, Cl. 156-187.000.

Petersen, Warren D., to Burd, Inc., Howell Division. Knock-down pedestal chair. 4,169,625, Cl. 297-349.000.

Peterson, Francis C., to C. Hager & Sons Hinge Manufacturing Company. Valve and cylinder-actuated lock controlled thereby. 4,169,616, Cl. 292-144.000.

Petrukhin, Vyacheslav S.: *See—*
Sokolov, Lev B.; Savinov, Valentin M.; and Petrukhin, Vyacheslav S., 4,169,932, Cl. 528-179.000.

Petruzzi, Vincent: *See—*
Lichtenstein, Arthur L.; Petruzzi, Vincent; and Anderson, Michael P., 4,169,552, Cl. 296-97.00C.

Petty, William D.: *See—*
Boudouris, Angelo; Petty, William D.; and Simonds, Clarence S., 4,169,566, Cl. 242-55.180.

Pfizer Inc.: *See—*
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Jefferson, Mark T.; Huang, Liang H.; Shibakawa, Riichiro; and Tone, Junsuke, 4,169,887, Cl. 424-119.000.
Hess, Hans-Jurgen E.; and Johnson, Michael R., 4,169,895, Cl. 424-320.000.
Plattner, Jacob J., 4,169,849, Cl. 260-558.00S.

Phalanx Corporation: *See—*
Estrada, Jose L., 4,169,394, Cl. 74-713.000.

Phillips, Carmen S., to International Harvester Company. Belt-type baler for cylindrical bales. 4,169,347, Cl. 56-341.000.

Phillips Petroleum Company: *See—*
Childs, William V., 4,169,960, Cl. 568-842.000.
Drehman, Lewis E., 4,169,815, Cl. 252-466.0PT.
Hitzman, Donald O., 4,169,762, Cl. 435-243.000.
Johnston, Chester C., Jr.; Bertus, Brent J.; and Hessert, James E., 4,169,797, Cl. 252-8.55C.
McDaniel, Max P., 4,169,926, Cl. 526-106.000.
Meigs, Robert W., 4,169,510, Cl. 175-65.000.
Murtha, Timothy P., 4,169,857, Cl. 260-586.00P.
Nielsen, Richard H.; and Dale, Glenn H., 4,169,784, Cl. 208-113.000.

PhotoSystems: *See—*
Culler, Jimmie G., 4,169,671, Cl. 354-312.000.

Piccone, Dante E.: *See—*
Hysell, Robert E.; and Piccone, Dante E., 4,170,019, Cl. 357-22.000.

Picker Corporation: *See—*
Kellogg, Seeley C.; Peluso, Philip J.; and Bernardi, Richard B., 4,169,385, Cl. 73-610.000.

Pieper, Helmut, to Sorg GmbH & Co. KG. Electrically heated melting furnace for mineral materials. 4,169,963, Cl. 13-6.000.

Pines, Seemon H.: *See—*
Gal, George; and Pines, Seemon H., 4,169,858, Cl. 260-590.00R.

Piquard, Jean-Francois, to Commissariat a l'Energie Atomique. Device for rheoplethylsmography by occlusion. 4,169,463, Cl. 128-693.000.

Pitney-Bowes, Inc.: *See—*
Roetter, Francis T.; Oeschger, Frank A.; and Pearson, Charles B., 4,169,341, Cl. 53-154.000.

Pla, Jean: *See—*
Plan, Robert; Liautaud, Jacques; Makula, Marie-France; Gattel, Paule; Pla, Jean; and Debrus, Andre, 4,169,829, Cl. 260-122.000.

Plan, Robert; Liautaud, Jacques; Makula, Marie-France; Gattel, Paule; Pla, Jean; and Debrus, Andre, to Institut Merieux. Process for the preparation of purified albumin and albumin obtained by said process. 4,169,829, Cl. 260-122.000.

Platt Saco Lowell Limited: *See—*
Blackburn, Reginald M., deceased, 4,169,348, Cl. 57-58.910.

Plattner, Jacob J., to Pfizer Inc. 11-Desoxy-15-thiaprostaglandins. 4,169,849, Cl. 260-558.00S.

Plokhov, Viktor I.: *See—*
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.

Plyler, Robert G.; and Suverison, Lyle B., to General Motors Corporation. Pin type electrical contact terminal. 4,169,654, Cl. 339-252.00P.

Pond, David M.; Dickason, William C.; and Elam, Edward U., to Eastman Kodak Company. Bichromophoric benzoxazole ultraviolet stabilizers. 4,169,837, Cl. 548-224.000.

Ponticello, Gerald S.: *See—*
Baldwin, John J.; and Ponticello, Gerald S., 4,169,835, Cl. 548-213.000.

Popovich, John M.; and Thornbury, Thomas R. Solar converter system with thermal overload protection. 4,169,460, Cl. 126-422.000.

Popplewell, James M.; Acton, Constance F.; and Brock, Andrew J., to Olin Corporation. Corrosion resistant copper base alloys for heat exchanger tube. 4,169,729, Cl. 75-154.000.

Portes, Alain: *See—*
Descoins, Daniel; Portes, Alain; and Lafon, Pierre, 4,169,879, Cl. 422-220.000.

Portinaro, Santino, to Fiat-Allis Macchine Movimento Terra S.p.A. Device for monitoring the serviceability of optical indicators. 4,170,004, Cl. 340-514.000.

Potschka, Joseph: *See—*
Potter, Dennis G.; Dietrich, Hagen; and Potschka, Joseph, 4,169,618, Cl. 292-169.150.

Potter, Dennis G.; Dietrich, Hagen; and Potschka, Joseph, to Norris Industries. Plastic door lock. 4,169,618, Cl. 292-169.150.

PPG Industries, Inc.: *See—*
Boberski, William G.; Seiner, Jerome A.; and Blasko, John E., 4,169,735, Cl. 106-84.000.
Claassen, George R.; and Mickelic, Raymond J., 4,169,622, Cl. 294-118.000.
Jensen, Thomas H., 4,169,551, Cl. 226-92.000.

Precausta, Pierre; Bugand, Marc; Comte, Philippe; and Zwingelstein, Georges, to Institut Merieux. Process for the cultivation of viruses. 4,169,761, Cl. 435-235.000.

Presley, Rex W., to Bendix Corporation, The. Power steering device. 4,169,515, Cl. 180-149.000.

Pretorius, Victor; and Schieke, Jacobus D., to South African Inventions Development Corporation. Solid surface texture suitable for a stationary phase for chromatography. 4,169,790, Cl. 210-31.00C.

Price, Barry J.; Clitherow, John W.; and Bradshaw, John, to Allen & Hansbury, Limited. N'-Derivatives of N-(2-mercapto-ethyl)-2-nitro-1,1-ethenediamine. 4,169,855, Cl. 260-583.0EE.

Price, Jerry D., to Eli Lilly and Company. Carton and liner with integral handle. 4,169,539, Cl. 220-410.000.

Primbsch, Erik: *See—*
Kaule, Walter; and Primbsch, Erik, 4,169,662, Cl. 350-358.000.

Probst, Heinz: *See—*
Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, 4,169,810, Cl. 252-301.240.

Procter & Gamble Company, The: *See—*
Davis, Jerry E.; Mueller, Frank J.; and Novosel, Gerald W., 4,169,806, Cl. 252-99.000.
Kravis, David S., 4,169,901, Cl. 426-601.000.

Produits Chimiques Ugine Kuhlmann: *See—*
Cuer, Jean-Pierre; Floreancig, Antoine; and Wojcik, Jean, 4,169,880, Cl. 423-166.000.
Frank, Pierre; and Sailer, Andre L., 4,169,831, Cl. 260-159.000.

Proptis, S.A.: *See—*
Cortes, Antonio C., 4,169,318, Cl. 33-174.00A.

Puchkov, Mikhail I.: *See—*
Khimenko, Lev T.; Batkilin, Yakov M.; Legeza, Anatoly V.; and Puchkov, Mikhail I., 4,169,364, Cl. 72-56.000.

Pugach, Joseph, to Halcon Research & Development Corporation. Extractive purification of carboxylic acids containing monovalent and trivalent thallium carboxylates. 4,169,809, Cl. 252-186.000.

Pyramid Manufacturing Company: *See—*
Bryan, John F., Jr., 4,169,535, Cl. 212-8.00R.

Qwarfort, Rune T. Labelling machine. 4,169,750, Cl. 156-541.000.

R. O. Hull & Company, Inc.: *See—*
Lowery, Richard K.; and Willis, William J., 4,169,772, Cl. 204-55.00R.

Raab, Andrew F.: *See—*
Black, Charles E., III; and Raab, Andrew F., 4,169,972, Cl. 200-153.00K.

Raaf, Helmut; and Wagner, Helmar R., to Blendax-Werke R. Schneider GmbH & Co. Dental and oral hygiene preparations. 4,169,885, Cl. 424-16.000.

Rabischong, Pierre; and Bel, Jean-Pierre, to Institut National de la Sante et de la Recherche Medicale - I.N.S.E.R.M. Orthopaedic appliance for enabling paralytics to stand erect. 4,169,467, Cl. 128-80.00G.

Rader, Charles W.: *See—*
Khuntia, Natabara; and Rader, Charles W., 4,169,524, Cl. 188-170.000.

Ragard, Phillip A.; and Holmes, Robert H., to Universal Instruments Corporation. DIP component storage and dispensing magazine. 4,169,541, Cl. 221-281.000.

Raines, Kenneth, to National Patent Development Corporation. Low profile filter. 4,169,795, Cl. 210-446.000.

Rainey, Roderick C. T.: *See—*
Newby, Maurice P.; and Rainey, Roderick C. T., 4,169,424, Cl. 114-265.000.

Rakowski, Julius B. Football simulation game wherein standard playing cards are used. 4,169,600, Cl. 273-247.000.

Ramos, Joel A.; and Swanson, Roy T., to S & C Electric Company. Bounce-resistant contacts for a switch. 4,169,973, Cl. 200-256.000.

Ramsey, Kenneth C.: *See—*
Matthews, Paul E.; and Ramsey, Kenneth C., 4,169,730, Cl. 75-157.000.

Ransburg Corporation: *See—*
Decker, Herman W., 4,169,545, Cl. 222-136.000.

Rassmann, Christoph: *See—*
Weirich, Walter; Dettmers, Michael; Rassmann, Christoph; Heyer, Willi; Beyer, Herbert; and Linke, Horst, 4,169,689, Cl. 405-291.000.

Ratjen, Johann: *See—*
Vehling, Ernst; and Ratjen, Johann, 4,169,397, Cl. 83-100.000.

Rausch, Werner: *See—*
Lampatzer, Karl; and Rausch, Werner, 4,169,741, Cl. 148-6.160.

RCA Corporation: *See—*
Dischert, Robert A., 4,170,024, Cl. 358-41.000.
Fecht, Hans-Rudolf, 4,169,988, Cl. 315-371.000.
Ipri, Alfred C.; and Scott, Joseph H., Jr., 4,169,746, Cl. 148-175.000.
Marlowe, Frank J., 4,169,659, Cl. 358-150.000.
Zuber, John R., 4,169,807, Cl. 252-171.000.

Reed, Robert G., to Rockwell International Corporation. Inflatable radiation attenuator. 4,170,010, Cl. 343-18.00A.

Reese, C. Harris. Bedding plant transport device. 4,169,607, Cl. 280-47.190.

Reese, Robert H.; and Facko, Gerhardt, to Greif Bros. Corporation. Container with identification tag secured to the top chime and its method of manufacture. 4,169,326, Cl. 40-306.000.

Regie Nationale des Usines Renault: *See—*
Leblanc, Marc; and Lepretre, Bernard, 4,170,040, Cl. 364-442.000.

Remington Products, Inc.: *See—*
Kulpa, Walter J., 4,169,482, Cl. 132-40.000.

Rengo Kabushiki Kaisha (Rengo Co., Ltd.): *See—*
Tokuno, Masateru, 4,169,752, Cl. 156-157.000.

Renzetti, Andrew. Fly tying device. 4,169,562, Cl. 242-7.010.

Research Organics: *See—*
Ferguson, Wilfred J., 4,169,950, Cl. 544-158.000.

Rexer, Jurgen. *See—*
Kornmann, Michel; Nussbaum, Marcel; and Rexer, Jurgen, 4,169,426, Cl. 118-67.000.

Rexnord Inc.: *See—*
Hallstrom, James R.; Klatt, Kenneth G.; and Walling, Ronald L., 4,169,906, Cl. 427-183.000.

Rhone-Poulenc Industries: *See—*
Delaval, Jean-Claude; and Stagnetto, Joseph, 4,169,905, Cl. 427-177.000.

Richardson, Donald M., deceased: *See—*
Bamberger, Carlos E.; and Richardson, Donald M., deceased, 4,169,884, Cl. 423-648.00R.

Richardson, Elizabeth B., executrix: *See—*
Bamberger, Carlos E.; and Richardson, Donald M., deceased, 4,169,884, Cl. 423-648.00R.

Richardson, John S., to Sperry Rand Corporation. Independently controlled twine knives. 4,169,410, Cl. 100-5.000.

Richardson-Merrell Inc.: *See—*
Meyer, Donald R.; Sill, Arthur D.; and Tiernan, Paul L., 4,169,897, Cl. 424-330.000.

Ridgway, Peter C.; and Case, Derek F., to Data Recording Instrument Company Limited. Multi-track head with shielding elements interconnected with low resistance conductive paths. 4,170,033, Cl. 360-121.000.

Riegler, Ernst; and Schmidt, Manfred, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Base anchorage for heavy machinery. 4,169,569, Cl. 248-680.000.

Rieter Machine Works, Limited: *See—*
Lattmann, Werner; and Wildbolz, Rudolf, 4,169,632, Cl. 406-93.000.

Rittmann, Albert D. Touch-actuated electronic switch. 4,169,982, Cl. 307-116.000.

Robba, Max F.; and Aurousseau, Michel E., to Innothera. 1-(Benzothien-2'-yl)-3-morpholino propanones and therapeutic compositions containing same. 4,169,892, Cl. 424-248.510.

Robert Bosch GmbH: *See—*
Fleischer, Helmut, 4,169,437, Cl. 123-102.000.

Roberts, William E., to AM International, Inc. Microfiche duplicator. 4,169,675, Cl. 355-85.000.

Robertshaw Controls Company: *See—*
Brakebill, Harold G., 4,169,485, Cl. 137-14.000.
Smith, William N.; and Payne, Frank, 4,169,971, Cl. 200-67.00B.

Rockwell International Corporation: *See—*
Reed, Robert G., 4,170,010, Cl. 343-18.00A.

Roeck, Heinrich: *See—*
Freissmuth, Alfred; Gmoehling, Werner; Roeck, Heinrich; and Kniep, Peter, 4,169,724, Cl. 75-58.000.

Roetter, Francis T.; Oeschger, Frank A.; and Pearson, Charles B., to Pitney-Bowes, Inc. Document collating and envelope stuffing apparatus. 4,169,341, Cl. 53-154.000.

Rohm and Haas Company: *See—*
Weiler, Ernest D., 4,169,949, Cl. 544-133.000.

Rollins, Kay: *See—*
Wheeler, Raymond L.; Rollins, Kay; and Clarke, Brian G., 4,169,514, Cl. 180-127.000.

Romine, Donald J.: *See—*
Young, Ching T.; Romine, Donald J.; Woodruff, Phillip R.; Davis, Donald C.; Bode, James D.; and Tien, Tseng Y., 4,169,777, Cl. 204-195.00S.

Rosch, Gunter: *See—*
Gunther, Dieter; Erckel, Rudiger; Rosch, Gunter; and Probst, Heinz, 4,169,810, Cl. 252-301.240.

Ross, Charles O., to International Business Machines Corporation. Variable print speed control. 4,169,991, Cl. 318-599.000.

Rottmaier, Ludwig; and Merten, Rudolf, to Bayer Aktiengesellschaft. Process for the preparation of (thio)hydantoins substituted with amide groups. 4,169,931, Cl. 528-49.000.

Rowatt, Robert J.: *See—*
Gilbert, Ronald E.; Lynch, Thomas J.; and Rowatt, Robert J., 4,169,826, Cl. 260-33.6PQ.

Rubio, Charles A., to CVG-Siderurgica Del Orinoco, C.A. Method of treating sponge iron. 4,169,533, Cl. 209-11.000.

Rudolph, Volker: *See—*
Klein, Wilfried; Klink, Erich; Rudolph, Volker; and Wernicke, Friedrich, 4,170,017, Cl. 357-15.000.

Ruegg, Walter: *See—*
Witschi, Ernst; and Ruegg, Walter, 4,169,371, Cl. 73-116.000.

Ruff, Helmut: *See—*
Hockele, Max; and Ruff, Helmut, 4,169,652, Cl. 339-246.000.

Runge, Hartmut, to Siemens Aktiengesellschaft. Light emitting semiconductor component. 4,170,018, Cl. 357-17.000.

Rush, William F.: *See—*
Weil, Sanford A.; Rush, William F.; Wurm, Jaroslav; and Dufour, Raymond J., 4,169,362, Cl. 62-478.000.

Russel, Matthew J., to Eastman Kodak Company. Recirculating sheet feeder. 4,169,674, Cl. 355-14.000.

Ryer, Jack; Zielinski, James; Miller, Harold N.; and Brois, Stanley J., to Exxon Research & Engineering Co. Oxazoline containing additive. 4,169,836, Cl. 548-238.000.

S & C Electric Company: *See—*
Ramos, Joel A.; and Swanson, Roy T., 4,169,973, Cl. 200-256.000.

Sabreen, Bernard S.; and Aaron, Martin, to Centennial Plastics Co., Inc. Storage drum. 4,169,537, Cl. 220-70.000.

Sagan Industries, Inc.: *See—*
Ganz, James B.; Koval, Stephen; and Meenen, Raymond P., 4,169,344, Cl. 53-546.000.

Sagaser, Thomas M.; and Bodine, Dale P., to Clark Equipment Company. Signal actuating device. 4,169,513, Cl. 180-271.000.

Sailer, Andre L.: *See—*
Frank, Pierre; and Sailer, Andre L., 4,169,831, Cl. 260-159.000.

St. Clair, Oba L. Model aircraft launcher. 4,169,333, Cl. 46-74.00R.

Sakulevich, Faddei J.: *See—*
Chachin, Viktor N.; Sakulevich, Faddei J.; Olender, Leonty A.; Serdyaev, Grigory K.; Kosobutsky, Alexandr A.; Murkov, Oleg S.; and Sobolevsky, Vitaly P., 4,169,713, Cl. 51-7.000.

Salomon, Georges P. J., to Etablissements Francois Salomon et Fils. Ski boot. 4,169,325, Cl. 36-117.000.

Same, Hyem G.: *See—*
Crump, Desmond G.; Cornish, William G.; and Same, Hyem G., 4,169,427, Cl. 118-307.000.

Samelson, Charles F. Anti-snoring and anti-bruxism device. 4,169,473, Cl. 128-136.000.

Sanday, Santiago C., to Electric Power Research Institute, Inc. Ceramic rotor blade having root with double curvature. 4,169,694, Cl. 416-219.00R.

Sanders Associates, Inc.: *See—*
Townsend, Robert L., 4,170,001, Cl. 367-120.000.

Sandoz, Inc.: *See—*
Hardtmann, Goetz E., 4,169,893, Cl. 424-258.000.

Sandoz Ltd.: *See—*
Fleck, Fritz; Hervot, Emmanuel; Merk, Peter; Schmid, Horst; and Wiedemann, Achim, 4,169,702, Cl. 8-1.00W.
Wicki, Heinz; and Vogel, Claude, 4,169,832, Cl. 260-169.000.

Sangamo Weston, Inc.: *See—*
Kishel, Joseph F., 4,169,999, Cl. 337-2.000.

Sankyo Electric Company Limited: *See—*
Shimizu, Hideaki, 4,169,360, Cl. 62-323.000.

Saprykin, Anatoly A.: *See—*
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.

Sasaki, Reiichi: *See—*
Nagaoka, Yoshitomi; Tomimoto, Tetsuo; and Sasaki, Reiichi, 4,170,026, Cl. 358-188.000.

Satam Industries: *See—*
Blanchet, Andre F., 4,169,544, Cl. 222-134.000.

Sato, Yasushi; and Toyono, Tsutomu, to Canon Kabushiki Kaisha. Image transfer device. 4,169,673, Cl. 355-3.0TR.

Satoh, Akira: *See—*
Yoshioka, Kengo; Nozato, Teruichi; Uchiyama, Haruki; Satoh, Akira; Inoue, Shigeo; Togino, Yuji; Mori, Keisuke; and Satou, Ituro, 4,169,700, Cl. 431-174.000.

Satou, Ituro: *See—*
Yoshioka, Kengo; Nozato, Teruichi; Uchiyama, Haruki; Satoh, Akira; Inoue, Shigeo; Togino, Yuji; Mori, Keisuke; and Satou, Ituro, 4,169,700, Cl. 431-174.000.

Sauermann, Gerhard O.: *See—*
Benkley, Fred G.; and Sauermann, Gerhard O., 4,170,025, Cl. 358-139.000.

Saurefabrik Schweizerhall: *See—*
Degischer, Gerhard; Angst, Werner; and Valloton, Mario, 4,169,847, Cl. 260-544.00Y.

Savinov, Valentin M.: *See—*
Sokolov, Lev B.; Savinov, Valentin M.; and Petrukhin, Vyacheslav S., 4,169,932, Cl. 528-179.000.

Saxton, Wilbur L. Lawn mower chopping attachment. 4,169,561, Cl. 241-101.100.

Scala, Norma, administratrix: *See—*
Burke, Oliver W., Jr., deceased; and Humphreys, Victor T., 4,169,737, Cl. 106-308.00M.

Scallen, Terence J.; and Morrow, Cary J., to University Patents, Inc. Cholesterol biosynthesis inhibitors. 4,169,944, Cl. 536-27.000.

Scapellati, Umberto. Parts tray. 4,169,532, Cl. 206-557.000.

Scarola, Leonard S.: *See—*
Miller, John C.; Burnett, Archibald L.; and Scarola, Leonard S., 4,169,679, Cl. 366-76.000.

Schacht, Erich; Lauterbach, Gunter; Mehrhof, Werner; Curtze, Jurgen; Linden, Gerbert; Lust, Siegmund; and Thomas, Klaus, to Celamerck GmbH & Co. KG. 2-[4-(4-Chlorophenoxymethyl)-phenoxy]-propionic acid compounds as herbicides. 4,169,720, Cl. 71-108.000.

Scheib, William F., to Nalco Chemical Company. Quantity sensing system for a container. 4,169,377, Cl. 73-304.00R.

Schering Aktiengesellschaft: *See—*
Nusslein, Ludwig; and Arndt, Friedrich, 4,169,718, Cl. 71-90.000.
Vorbrueggen, Helmut, 4,169,943, Cl. 536-23.000.

Schieke, Jacobus D.: *See—*
Pretorius, Victor; and Schieke, Jacobus D., 4,169,790, Cl. 210-31.00C.

Schlicht, Raymond C., to Texaco Inc. Amine derivatives of lactam acid and their use as lubricating oil dispersants. 4,169,801, Cl. 252-51.50A.

Schmid, Horst: *See—*
Fleck, Fritz; Hervot, Emmanuel; Merk, Peter; Schmid, Horst; and Wiedemann, Achim, 4,169,702, Cl. 8-1.00W.

Schmidt, Manfred: *See—*
Riegler, Ernst; and Schmidt, Manfred, 4,169,569, Cl. 248-680.000.

Schmidt, Oskar: *See—*
Kubica, Wladyslaw; and Schmidt, Oskar, 4,169,494, Cl. 152-310.000.

Schmoock, Raymond. Safety belt. 4,169,518, Cl. 182-8.000.

Schneider, Abraham: *See—*
Lyons, James E.; Schneider, Abraham; and Myers, Harry K., Jr., 4,169,864, Cl. 585-27.000.
Myers, Harry K., Jr.; Lyons, James E.; and Schneider, Abraham, 4,169,863, Cl. 585-22.000.

Schneider, Alan A.: *See—*
Tataria, Harshad; and Schneider, Alan A., 4,169,779, Cl. 204-195.00P.

Schneider, Heinz-Walter: *See—*
Kummer, Rudolf; Schneider, Heinz-Walter; and Weiss, Franz-Josef, 4,169,956, Cl. 560-204.000.

Schnur, Jerry. Fishing gaff. 4,169,330, Cl. 43-5.000.

Scholes, Addison B., to Ball Corporation. Electrostatic process for coating electrically conductive objects such as beverage cans. 4,169,903, Cl. 427-28.000.

Schonafinger, Eduard; Deigner, Paul; Ohlinger, Manfred; Jakusch, Helmut; Amort, Jurgen; Nestler, Heinz; Seiler, Claus-Dietrich; and Ambros, Otto, to Dynamit Nobel Aktiengesellschaft. Iron oxide

magnetic pigments for the production of magnetic coatings. 4,169,912, Cl. 428-145.000.

Schonberger, Abram, to Schonberger, Abram; Traina, John L.; and Goodyear, Hugo. Variable speed transmission. 4,169,391, Cl. 74-5.00R.

Schreckenberg, Manfred; Konig, Klaus; Freitag, Dieter; and Serini, Volker, to Bayer Aktiengesellschaft. Process for the preparation of new high-molecular segmented polyester-polycarbonates which can be processed by thermoplastic methods and new polyester-polycarbonates obtained according to the process. 4,169,868, Cl. 525-439.000.

Schubert & Salzer: *See*—
Lehmann, Karl-Heinz; and Artzt, Peter, 4,169,564, Cl. 242-157.00R.

Schull, George R. Lock for extendable leg assembly. 4,169,687, Cl. 403-109.000.

Schultz, Phillip E.; and Crepeau, Robert G., to Allen-Bradley Company. Adjusting mechanism for a snap-acting Belleville washer. 4,169,390, Cl. 74-2.000.

Schweier, Guenther: *See*—
Gruber, Wolfgang; Frielingsdorf, Hans; Bachl, Robert; and Schweier, Guenther, 4,169,925, Cl. 526-96.000.

Schweizer, William E., to EBY Company. Wire-wrap assembly connector. 4,169,650, Cl. 339-198.00R.

SCM Corporation: *See*—
Hasman, John M., 4,169,844, Cl. 260-409.000.

Scott, Harold W., to Oil Recovery Corporation. Apparatus for generating a shock wave in a well hole. 4,169,503, Cl. 166-65.00R.

Scott, Hubert D.: *See*—
Arnold, Dan M.; Langford, Obie M.; Paap, Hans J.; and Scott, Hubert D., 4,169,979, Cl. 250-266.000.

Scott, Joseph H., Jr.: *See*—
Ipri, Alfred C.; and Scott, Joseph H., Jr., 4,169,746, Cl. 148-175.000.

Scott, Raymond L., to Wellhead Control Systems, Inc. Fluid introduction unit for wells. 4,169,504, Cl. 166-90.000.

Scovill Manufacturing Company: *See*—
Foults, Jonathan A., deceased, 4,169,421, Cl. 112-104.000.

See, Jacques L. A., to Substratum S.A. Plate for grating and grating resulting therefrom. 4,169,339, Cl. 52-177.000.

Seem, David M. Harvesting machine with an expandable truck loader. 4,169,536, Cl. 414-334.000.

Segalowicz, Joseph. Flexible hot water bottle. 4,169,493, Cl. 150-2.100.

Seiler, Claus-Dietrich: *See*—
Schonafinger, Eduard; Deigner, Paul; Ohlinger, Manfred; Jakusch, Helmut; Amort, Jurgen; Nestler, Heinz; Seiler, Claus-Dietrich; and Ambros, Otto, 4,169,912, Cl. 428-145.000.

Seiner, Jerome A.: *See*—
Boberski, William G.; Seiner, Jerome A.; and Blasko, John E., 4,169,735, Cl. 106-84.000.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See*—
Shiohara, Tomoo; and Horioka, Mikihiko, 4,169,819, Cl. 260-23.0XA.

Semix, Incorporated: *See*—
Lindmayer, Joseph, 4,169,739, Cl. 148-1.500.

Sequeira, Avilino, Jr.; and Barger, Frank L., to Texaco Inc. Control system for an N-methyl-2-pyrrolidone refining unit receiving light sour charge oil. 4,169,766, Cl. 196-14.520.

Serdyaev, Grigory K.: *See*—
Chachin, Viktor N.; Sakulevich, Faddei J.; Olender, Leonty A.; Serdyaev, Grigory K.; Kosobutsky, Alexandr A.; Murkov, Oleg S.; and Sobolevsky, Vitaly P., 4,169,713, Cl. 51-7.000.

Sergeeva, Anna N.: *See*—
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D., 4,169,365, Cl. 72-264.000.

Serini, Volker: *See*—
Schreckenberg, Manfred; Konig, Klaus; Freitag, Dieter; and Serini, Volker, 4,169,868, Cl. 525-439.000.

Servocavi Societa per Azioni: *See*—
Casati, Carlo, 4,169,966, Cl. 174-92.000.

Shaw, William S., to Shaw's Modular Fireplaces, Ltd. Zero clearance fireplace type heating device. 4,169,458, Cl. 126-120.000.

Shaw's Modular Fireplaces, Ltd.: *See*—
Shaw, William S., 4,169,458, Cl. 126-120.000.

Shenandoah Manufacturing Co., Inc.: *See*—
Christophel, Reuben L., 4,169,457, Cl. 126-65.000.

Sheridan, Richard C., to Tennessee Valley Authority. Purification of phosphoric acid with oxalic acid. 4,169,882, Cl. 423-321.00R.

Sherwin-Williams Company, The: *See*—
Yapp, William J.; and McDonald, Robert E., 4,169,825, Cl. 260-31.600.

Shibakawa, Riichiro: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Jefferson, Mark T.; Huang, Liang H.; Shibakawa, Riichiro; and Tone, Junsuke, 4,169,887, Cl. 424-119.000.

Shimizu, Hideaki, to Sankyo Electric Company Limited. Refrigerant compressors for automotive air conditioning refrigerating systems. 4,169,360, Cl. 62-323.000.

Shin-Etsu Chemical Co. Ltd.: *See*—
Noshiro, Atsumi; Obata, Hiroyuki; Takamizawa, Minoru; and Inoue, Yoshio, 4,169,731, Cl. 96-1.00R.

Shinano Kikaku Company Limited: *See*—
Endo, Tadakazu; Nomura, Susumu; Matsumoto, Masato; and Takahashi, Kojiro, 4,169,669, Cl. 353-95.000.

Shinkoriko Co., Ltd.: *See*—
Takeuchi, Yo; Komori, Shinichi; Toda, Kazuo; and Miyashita, Yasumasa, 4,169,728, Cl. 75-141.000.

Shiohara, Tomoo; and Horioka, Mikihiko, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Stabilized chlorine-containing resin composition. 4,169,819, Cl. 260-23.0XA.

Shipley, John F., to International Business Machines Corporation. Photosensitive coating composition and use thereof. 4,169,732, Cl. 96-35.100.

Shiroki, Masami; Maruyama, Yutaka; and Goto, Kazuhiro, to Yoshitomi Pharmaceutical Industries, Ltd. Penicillamine compounds. 4,169,899, Cl. 424-246.000.

Shon, Gary M.: *See*—
Haug, Henry W.; Shon, Gary M.; and Lenhardt, Albert P., 4,169,461, Cl. 126-437.000.

Sickinger, Albert: *See*—
Wunder, Max; and Sickinger, Albert, 4,169,367, Cl. 73-7.000.

Siderugica Italia S.A.: *See*—
Fernandes, Roberto, 4,169,723, Cl. 75-41.000.

Sidi, Henri, to Tenneco Chemicals, Inc. Alkanolamine salts of dihydroxystearic acid as emulsifier in the polymerization of vinyl chloride. 4,169,928, Cl. 526-211.000.

Siemens Aktiengesellschaft: *See*—
Runge, Hartmut, 4,170,018, Cl. 357-17.000.

Sill, Anthony E.: *See*—
Birkemeier, William P.; and Sill, Anthony E., 4,170,011, Cl. 343-100.0CS.

Sill, Arthur D.: *See*—
Meyer, Donald R.; Sill, Arthur D.; and Tiernan, Paul L., 4,169,897, Cl. 424-330.000.

Simms, John A., to Du Pont de Nemours, E. I., and Company. Mercaptoisocyanates and process for preparing the same. 4,169,955, Cl. 560-159.000.

Simon Container Machinery Limited: *See*—
Tokuno, Masateru, 4,169,752, Cl. 156-157.000.

Simon, Hans. Cable grommet with tension relief. 4,169,572, Cl. 248-56.000.

Simonds, Clarence S.: *See*—
Boudouris, Angelo; Petty, William D.; and Simonds, Clarence S., 4,169,566, Cl. 242-55.180.

Simpson, Lawrence D.: *See*—
Du Bois, Loring E.; and Simpson, Lawrence D., 4,170,021, Cl. 357-55.000.

Sin, Lin. Ellipsograph. 4,169,315, Cl. 33-30.00C.

Sitter, Matthew M.: *See*—
Kutch, Edward F.; Meyers, Robert M.; and Sitter, Matthew M., 4,169,822, Cl. 260-27.0BB.

Skopil, Arthur, to VDO Adolf Schindling AG. Bimetal operated indicator. 4,169,381, Cl. 73-363.500.

Skowronski, Michael J.: *See*—
Moss, Ernest K.; DeLeon, Alberto; and Skowronski, Michael J., 4,169,921, Cl. 521-125.000.

SKW Trostberg Aktiengesellschaft: *See*—
Freissmuth, Alfred; Gmoehling, Werner; Roeck, Heinrich; and Kniep, Peter, 4,169,724, Cl. 75-58.000.

Slater, Dan; Gale, John C.; and Matza, Joseph L., to Magicam, Inc. Foreground stabilization system for use in composite photography. 4,169,666, Cl. 352-85.000.

Smith, David W.; and Baadsgaard, Marinus J., to FMC Corporation. Regeneration of scale-coated activated carbon with acid wash. 4,169,812, Cl. 252-415.000.

Smith, Dentis M.; and Spector, George. Trailer tongue extension. 4,169,611, Cl. 280-482.000.

Smith, Gordon. Windshield wiper adjustment assembly. 4,169,298, Cl. 15-250.330.

Smith, James B. Hand rails extensibly mounted in guide tubes at the rear of a van or trailer. 4,169,623, Cl. 296-1.00C.

Smith, William N.; and Payne, Frank, to Robertshaw Controls Company. Electrical switch construction. 4,169,971, Cl. 200-67.00B.

Smithson, David J.: *See*—
Bouvier, Claude J.; Smithson, David J.; and Luais, Jean-Paul, 4,170,038, Cl. 364-200.000.

Snyder, Eugene I., to Kraft, Inc. Method for hydrogenation. 4,169,843, Cl. 260-409.000.

Sobolevsky, Vitaly P.: *See*—
Chachin, Viktor N.; Sakulevich, Faddei J.; Olender, Leonty A.; Serdyaev, Grigory K.; Kosobutsky, Alexandr A.; Murkov, Oleg S.; and Sobolevsky, Vitaly P., 4,169,713, Cl. 51-7.000.

Societa' Italiana Resine S.I.R. S.p.A.: *See*—
Vargiu, Silvio; Manzoni, Pier L.; Bernasconi, Mario; and Parodi, Antonio, 4,169,937, Cl. 525-493.000.

Societe Chimique des Charbonnages: *See*—
Descoins, Daniel; Portes, Alain; and Lafon, Pierre, 4,169,879, Cl. 422-220.000.

Societe les Piles Wonder: *See*—
Stiker, Bernard; and Jolas, Fernand, 4,169,780, Cl. 204-206.000.

Societe Lignes Telegraphiques et Telephoniques: *See*—
Bessard, Jacques; Dallemagne, Robert; and Hannigsberg, Claude, 4,169,969, Cl. 179-84.0VF.

Sokolov, Lev B.; Savinov, Valentin M.; and Petrukhin, Vyacheslav S. Method of producing poly-p-phenyleneterephthalamide or its copolymers. 4,169,932, Cl. 528-179.000.

Sony Corporation: *See*—
Yamakoshi, Akira; and Tsuchiya, Takao, 4,170,023, Cl. 358-19.000.

Sorg GmbH & Co. KG: *See*—
Pieper, Helmut, 4,169,963, Cl. 13-6.000.

South African Inventions Development Corporation: *See*—
Pretorius, Victor; and Schieke, Jacobus D., 4,169,790, Cl. 210-31.00C.

Spani, Hans: *See—*
Glockner, Rolf; Spani, Hans; and Stutz, Hansruedi, 4,169,399, Cl. 83-361.000.
Spear, Walter E.: *See—*
Kalbitzer, Siegfried; Muller, Gerhard; Spear, Walter E.; and Le Comber, Peter G., 4,169,740, Cl. 148-1.500.
Spector, George: *See—*
Frischmann, Richard D.; and Spector, George, 4,169,601, Cl. 273-269.000.
Smith, Dentis M.; and Spector, George, 4,169,611, Cl. 280-482.000.
Sperry Rand Corporation: *See—*
Richardson, John S., 4,169,410, Cl. 100-5.000.
Stackman, Robert W.: *See—*
DeGuia, Andrea A.; Stackman, Robert W.; and Conciatori, Anthony B., 4,169,945, Cl. 536-114.000.
Stagnetto, Joseph: *See—*
Delaval, Jean-Claude; and Stagnetto, Joseph, 4,169,905, Cl. 427-177.000.
Stair, Virgil H.: *See—*
Evenson, Dale D.; and Stair, Virgil H., 4,169,311, Cl. 30-276.000.
Standard Oil Company (Indiana): *See—*
Berry, Kay L., 4,169,506, Cl. 166-256.000.
Stape, William J.; Hopkins, John R.; and Weber, Robert N., to AMP Incorporated. Insulated contact. 4,169,646, Cl. 339-99.00R.
Stark, Ludwig, to Vespa Instruments Establishment. Process for transferring supports, and supports for use therein. 4,169,587, Cl. 271-264.000.
Starostin, Jury S.; Erokhov, Veniamin K.; Golovinov, Mikhail F.; Berdjugina, Antonina I.; Plokhov, Viktor I.; Kirillov, Lev. P.; Saprykin, Anatoly A.; Krotkov, Vladimir N.; Sergeeva, Anna N.; and Konovalenko, Evgeny D. Needle for pressing internally-finned pipes. 4,169,365, Cl. 72-264.000.
Stearns, George, to Wagner Electric Corporation. Multi-function parking brake control valve with separated supply and control inputs. 4,169,633, Cl. 303-7.000.
Stefano, Patrick L., to Hustler, Inc. Detachable antenna mounting bracket for automobiles. 4,169,575, Cl. 248-539.000.
Steinwart, Johannes; and Will, Peter, to Audi Nsu Auto Union Aktiengesellschaft. Fuel injection rotary piston internal combustion engine of the trochoidal type. 4,169,452, Cl. 123-206.000.
Stelmasik, Gregory A.; and Anderson, Richard T., to Owatonna Tool Company. Shop press. 4,169,412, Cl. 100-257.000.
Stelwagen, Jan; and van Sambeeck, Alexius J. T., to U.S. Philips Corporation. Television camera tube having resilient gauze supporting structure. 4,169,986, Cl. 313-383.000.
Stiker, Bernard; and Jolas, Fernand, to Societe les Piles Wonder. Process and apparatus for making negative electrodes, in particular in cadmium or zinc, for electrochemical generators, and the negative electrodes thus obtained. 4,169,780, Cl. 204-206.000.
Stilling, Johann. Sign box structure. 4,169,327, Cl. 40-549.000.
Stima, Joseph F., to Colgate-Palmolive Company. Artificial fireplace logs. 4,169,709, Cl. 44-10.00R.
Stogryn, Eugene L.: *See—*
Klemann, Lawrence P.; Newman, Gerald H.; and Stogryn, Eugene L., 4,169,808, Cl. 252-182.100.
Strange, Booth B., to Western Geophysical Co. of America. Seismic system using a combination of generically different sources. 4,170,002, Cl. 367-23.000.
Strube, Richard E. Crib death detector. 4,169,462, Cl. 128-2.00R.
Studiengessellschaft Kohle mbH: *See—*
Jonas, Klaus, 4,169,845, Cl. 260-429.0CY.
Stutz, Hansruedi: *See—*
Glockner, Rolf; Spani, Hans; and Stutz, Hansruedi, 4,169,399, Cl. 83-361.000.
Substratum S.A.: *See—*
See, Jacques L. A., 4,169,339, Cl. 52-177.000.
Sueoka, Tetsuro; and Udagawa, Hisao, to Kabushiki Kaisha Meidensha; and International Rectifier Corporation, Japan Ltd. Gate turn-off thyristor for reducing the on current thereof. 4,170,020, Cl. 357-38.000.
Sugitani, Tatsuo: *See—*
Iwase, Hirohide; Maeda, Yukio; and Sugitani, Tatsuo, 4,169,370, Cl. 73-116.000.
Sully, George R., to Antenna and Vehicular Accessories, Inc. Antenna coil. 4,170,014, Cl. 343-749.000.
Sumitomo Electric Industries, Ltd.: *See—*
Kobayashi, Mitsunori; Doi, Yoshihiko; Tobioka, Masaaki; and Yamamoto, Takaharu, 4,169,913, Cl. 428-217.000.
Sung, Rodney L.; and Zoleski, Benjamin H., to Texaco Inc. Lubricating oil composition. 4,169,799, Cl. 252-42.700.
Suntech, Inc.: *See—*
Lyons, James E.; Schneider, Abraham; and Myers, Harry K., Jr., 4,169,864, Cl. 585-27.000.
Myers, Harry K., Jr.; Lyons, James E.; and Schneider, Abraham, 4,169,863, Cl. 585-22.000.
Sussel, Howard. Article of jewelry with flashing diode. 4,170,036, Cl. 362-104.000.
Sutherland, David T.: *See—*
Bird, Harry L.; and Sutherland, David T., 4,169,538, Cl. 220-334.000.
Suverison, Lyle B.: *See—*
Plyler, Robert G.; and Suverison, Lyle B., 4,169,654, Cl. 339-252.00P.
Suzuki, Kazuie, to Hokushin Electric Works, Ltd. Magnetic flowmeter. 4,169,375, Cl. 73-194.0EM.
Suzuki, Seiichi: *See—*
Nishimoto, Takashi; Suzuki, Seiichi; and Takamori, Hiroyoshi, 4,169,605, Cl. 277-188.00A.
Suzuki, Shigeto: *See—*
Wall, Robert G.; Wilkes, John B.; and Suzuki, Shigeto, 4,169,961, Cl. 568-857.000.
Swalen, Jerome D.: *See—*
Czornyj, George; Swalen, Jerome D.; and Wu, Anthony W., 4,169,904, Cl. 427-44.000.
Swanson, Roy T.: *See—*
Ramos, Joel A.; and Swanson, Roy T., 4,169,973, Cl. 200-256.000.
Sweden Freezer Manufacturing Co.: *See—*
Weerstra, Rienk, 4,169,359, Cl. 62-178.000.
Swiss Aluminium Ltd.: *See—*
Ames, Adolf, 4,169,366, Cl. 72-269.000.
Wolf, Emanuel; and Weber, Alfred, 4,169,628, Cl. 297-454.000.
Synemed, Inc.: *See—*
Bailey, Paul F., Jr., 4,169,664, Cl. 351-23.000.
Murr, William C., 4,169,663, Cl. 351-7.000.
Syntex (U.S.A.) Inc.: *See—*
Fakhouri, Najib M., 4,169,703, Cl. 8-10.200.
Fakhouri, Najib M., 4,169,704, Cl. 8-10.200.
Systron-Donner Corporation: *See—*
Flanner, Philip D.; and Malcom, George G., 4,169,384, Cl. 73-516.00R.
Szalay, Frank; and Kubik, Joseph C., to Eastern Tool & Machine, Inc. Fifth wheel bearing plate cover. 4,169,635, Cl. 308-136.000.
Szymanski, Stanley: *See—*
Lai, Peter; Szymanski, Stanley; and Christensen, Norman L., 4,169,773, Cl. 204-98.000.
Szymczak, Edward J., to Cameron Iron Works, Inc. Underwater well apparatus. 4,169,507, Cl. 166-340.000.
Tada, Shinsaku: *See—*
Yoshida, Kazuo; Tada, Shinsaku; and Kitamura, Atsushi, 4,169,911, Cl. 428-36.000.
Takagi, Tosio. Clipping hanger. 4,169,549, Cl. 223-96.000.
Takahashi, Akio, to Hooker Chemicals & Plastics Corp. Method of polymerizing vinyl halide with olefin polymers and copolymers and compositions thereof. 4,169,870, Cl. 525-315.000.
Takahashi, Kazuo: *See—*
Iytaka, Tateshi; Matsuo, Syunji; Nagatani, Toshio; Takahashi, Kazuo; and Habu, Takeshi, 4,169,733, Cl. 96-50.0PT.
Takahashi, Koji: *See—*
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, 4,169,803, Cl. 252-62.900.
Takahashi, Kojiro: *See—*
Endo, Tadakazu; Nomura, Susumu; Matsumoto, Masato; and Takahashi, Kojiro, 4,169,669, Cl. 353-95.000.
Takaishi, Naotake: *See—*
Aigami, Koji; Inamoto, Yoshiaki; Ohsugi, Motoyoshi; Fujikura, Yoshiaki; and Takaishi, Naotake, 4,169,953, Cl. 560-117.000.
Inamoto, Yoshiaki; Aigami, Koji; Takaishi, Naotake; and Nakajima, Motoki, 4,169,958, Cl. 568-665.000.
Takamizawa, Minoru: *See—*
Noshiro, Atsumi; Obata, Hiroyuki; Takamizawa, Minoru; and Inoue, Yoshio, 4,169,731, Cl. 96-1.00R.
Takamori, Hiroyoshi: *See—*
Nishimoto, Takashi; Suzuki, Seiichi; and Takamori, Hiroyoshi, 4,169,605, Cl. 277-188.00A.
Takeuchi, Sadatoshi; and Kurihara, Osamu, to Kabushiki Kaisha Komatsu Seisakusho. Airflow regulating apparatus for radiator. 4,169,501, Cl. 165-126.000.
Takeuchi, Yo; Komori, Shinichi; Toda, Kazuo; and Miyashita, Yasumasa, to Mitsubishi Kinzoku Kabushiki Kaisha; and Shinkoriko Co., Ltd. Corrosion resistant bright aluminum alloy for die-casting. 4,169,728, Cl. 75-141.000.
Takezawa, Kenji; Nakanishi, Masaharu; and Yugari, Yasumi, to Ajinomoto Co., Inc. Process for production of urokinase. 4,169,764, Cl. 435-215.000.
Talbot, James R., to Fiber Industries, Inc. Production of simulated spun-like bulked yarn. 4,169,349, Cl. 57-289.000.
Tamai, Mitsuru: *See—*
Yasuhara, Takeshi; Tamai, Mitsuru; and Yuhara, Tadanori, 4,169,389, Cl. 73-718.000.
Tamalenus, Frank E.: *See—*
Haase, Donald A.; and Tamalenus, Frank E., 4,169,898, Cl. 424-331.000.
Tamura, Raymond M. Helicopter lifting and propelling apparatus. 4,169,567, Cl. 244-17.110.
Tanaka, Masaru; Tasaka, Kazuyoshi; and Tanigawa, Tetuo, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine for an automobile provided with an air-conditioner. 4,169,450, Cl. 123-198.00D.
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, to TDK Electronic Company. Ferromagnetic piezoelectric ceramic composition. 4,169,803, Cl. 252-62.900.
Tanaka, Yoshitake: *See—*
Nakayama, Kiyoshi; Araki, Kazumi; and Tanaka, Yoshitake, 4,169,763, Cl. 435-115.000.
Tange, Fumiko, to Ogasawara, Kaoru, a part interest. Binding device for binding openings of bags or the like. 4,169,346, Cl. 53-583.000.
Tanham, Horst, to Escomat Maschinenbau Schmitt & Co. Box-folding machine and method of setting up same. 4,169,406, Cl. 93-49.0AC.

Tanigawa, Tetuo: *See*—
Tanaka, Masaru; Tasaka, Kazuyoshi; and Tanigawa, Tetuo, 4,169,450, Cl. 123-198.00D.
Taplin, John F. Pilot operated four way valve. 4,169,490, Cl. 137-596.180.
Taplin, Lael B.; and Bode, James D., to Bendix Corporation, The. Cruise economy system. 4,169,440, Cl. 123-119.0EC.
Tarosky, Jack; Fahnestock, Melvin R.; and Flowers, Leonard J., to Aluminum Company of America. Automatic device for stacking circular workpieces. 4,169,586, Cl. 271-1.000.
Tasaka, Kazuyoshi: *See*—
Tanaka, Masaru; Tasaka, Kazuyoshi; and Tanigawa, Tetuo, 4,169,450, Cl. 123-198.00D.
Tataria, Harshad; and Schneider, Alan A., to Catalyst Research Corporation. Electrochemical cell for the detection of hydrogen sulfide. 4,169,779, Cl. 204-195.00P.
Taylor, Lawrence H. Double purpose goal structure. 4,169,598, Cl. 273-127.00B.
Taylor, Richard L.; Drosd, Ralph D., deceased; and by Gregory, Luther W., administrator, to United States of America, Air Force. Intercept receiver for double-side-band, noise-like signals. 4,169,993, Cl. 325-470.000.
TDK Electronic Company: *See*—
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, 4,169,803, Cl. 252-62.900.
Technicon Instruments Corp.: *See*—
Keyes, Melvin H., 4,169,765, Cl. 435-291.000.
Teitelbaum, Bernard R.; and Carrico, John P., to Bendix Corporation, The. Integrated spark plug-combustion pressure sensor. 4,169,388, Cl. 73-714.000.
Teledyne Industries, Inc.: *See*—
Walker, Henry V., 4,169,401, Cl. 84-22.000.
Tenneco Chemicals, Inc.: *See*—
Sidi, Henri, 4,169,928, Cl. 526-211.000.
Tennessee Valley Authority: *See*—
Sheridan, Richard C., 4,169,882, Cl. 423-321.00R.
Texaco Development Corporation: *See*—
Knifton, John F., 4,169,853, Cl. 260-575.000.
Texaco Inc.: *See*—
Arnold, Dan M.; Langford, Obie M.; Paap, Hans J.; and Scott, Hubert D., 4,169,979, Cl. 250-266.000.
Schlicht, Raymond C., 4,169,801, Cl. 252-51.50A.
Sequeira, Avilino, Jr.; and Barger, Frank L., 4,169,766, Cl. 196-14.520.
Sung, Rodney L.; and Zoleski, Benjamin H., 4,169,799, Cl. 252-42.700.
Texas Instruments Incorporated: *See*—
Norman, Lloyd E., 4,169,682, Cl. 400-120.000.
Thermo-Lab Instruments, Inc.: *See*—
Capone, David M., 4,169,769, Cl. 204-1.00T.
Thiele, John R.: *See*—
Olsen, Richard J.; Brinkley, Max D.; and Thiele, John R., 4,169,877, Cl. 264-315.000.
Thijssen, Francina H. J.: *See*—
Houbiers, Joannes P. M.; and Thijssen, Francina H. J., 4,169,839, Cl. 549-81.000.
Thomas, Klaus: *See*—
Schacht, Erich; Lauterbach, Gunter; Mehrhof, Werner; Curtze, Jurgen; Linden, Gerbert; Lust, Siegmund; and Thomas, Klaus, 4,169,720, Cl. 71-108.000.
Thompson, H. Lytle, to UOP Inc. Visbreaking process. 4,169,782, Cl. 208-102.000.
Thomson-Brandt: *See*—
Kretschmer, Sylvain; Lacotte, Jean-Pierre; and Oprandi, Pierre, 4,170,022, Cl. 358-4.000.
Thornbury, Thomas R.: *See*—
Popovich, John M.; and Thornbury, Thomas R., 4,169,460, Cl. 126-422.000.
Thurmond, Elmer T., Jr., to Equipment Company of America. Drum deheader. 4,169,313, Cl. 30-432.000.
Thurmond, Elmer T., Jr., to Equipment Company of America. Trailer stabilizing jack. 4,169,581, Cl. 254-45.000.
Tien, Tseng Y.: *See*—
Young, Ching T.; Romine, Donald J.; Woodruff, Phillip R.; Davis, Donald C.; Bode, James D.; and Tien, Tseng Y., 4,169,777, Cl. 204-195.00S.
Tiernan, Paul L.: *See*—
Meyer, Donald R.; Sill, Arthur D.; and Tiernan, Paul L., 4,169,897, Cl. 424-330.000.
Tietz, Hans-Jurgen: *See*—
Werner, Gerhard; Tietz, Hans-Jurgen; Wagner, Reinhard; and Dathe, Wolfgang, 4,169,821, Cl. 260-27.0BB.
Tobioka, Masaaki: *See*—
Kobayashi, Mitsunori; Doi, Yoshihiko; Tobioka, Masaaki; and Yamamoto, Takaharu, 4,169,913, Cl. 428-217.000.
Toda, Kazuo: *See*—
Takeuchi, Yo; Komori, Shinichi; Toda, Kazuo; and Miyashita, Yasumasa, 4,169,728, Cl. 75-141.000.
Todeschini, Eugenio, to Massey-Ferguson Service, N.V. Control devices. 4,169,443, Cl. 123-139.00R.
Togino, Yuji: *See*—
Yoshioka, Kengo; Nozato, Teruichi; Uchiyama, Haruki; Satoh, Akira; Inoue, Shigeo; Togino, Yuji; Mori, Keisuke; and Satou, Ituro, 4,169,700, Cl. 431-174.000.
Tokuno, Masateru, to Rengo Kabushiki Kaisha (Rengo Co., Ltd.); and Simon Container Machinery Limited. Process and apparatus for splicing web. 4,169,752, Cl. 156-157.000.
Tolo, Incorporated: *See*—
Lockshaw, James J., 4,169,793, Cl. 210-169.000.
Tom, Thomas: *See*—
Wukusick, Carl S.; Tom, Thomas; and Buchakjian, Leo, Jr., 4,169,742, Cl. 148-32.500.
Tomimoto, Tetsuo: *See*—
Nagaoka, Yoshitomi; Tomimoto, Tetsuo; and Sasaki, Reiichi, 4,170,026, Cl. 358-188.000.
Tone, Junsuke: *See*—
Celmer, Walter D.; Cullen, Walter P.; Moppett, Charles E.; Jefferson, Mark T.; Huang, Liang H.; Shibakawa, Riichiro; and Tone, Junsuke, 4,169,887, Cl. 424-119.000.
Topouzian, Armenag, to Ford Motor Company. Double seal for sodium sulfur battery. 4,169,919, Cl. 429-104.000.
Toray Industries, Inc.: *See*—
Yoshida, Kazuo; Tada, Shinsaku; and Kitamura, Atsushi, 4,169,911, Cl. 428-36.000.
Torreggiani, Gianni: *See*—
Cocuzza, Gioacchino; and Torreggiani, Gianni, 4,169,856, Cl. 260-585.00B.
Tortola, Angelo: *See*—
Miffitt, Donald C.; and Tortola, Angelo, 4,169,588, Cl. 272-70.000.
Toshio, Sato. Artificial skating-rink floor. 4,169,688, Cl. 404-40.000.
Townsend, Robert L., to Sanders Associates, Inc. Capacitor goniometer tilt compensation for acoustic transducing system. 4,170,001, Cl. 367-120.000.
Toyo Kohan Co., Ltd.: *See*—
Tsutsui, Nobuyuki; Omura, Hitoshi; Mizobe, Takashi; Kanda, Katsumi; and Fujimoto, Terunori, 4,169,916, Cl. 428-447.000.
Toyo Soda Manufacturing Co., Ltd.: *See*—
Kikuchi, Mitsuo; and Hiraga, Yoichi, 4,169,881, Cl. 423-321.00R.
Toyono, Tsutomu: *See*—
Sato, Yasushi; and Toyono, Tsutomu, 4,169,673, Cl. 355-3.0TR.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See*—
Hirano, Tadayoshi; and Kawagoe, Michio, 4,169,441, Cl. 123-119.0EC.
Iwase, Hirohide; Maeda, Yukio; and Sugitani, Tatsuo, 4,169,370, Cl. 73-116.000.
Iwata, Minoru; Yasuda, Takeru; and Hirosawa, Hidenori, 4,169,352, Cl. 60-276.000.
Tanaka, Masaru; Tasaka, Kazuyoshi; and Tanigawa, Tetuo, 4,169,450, Cl. 123-198.00D.
Traid Fastener Corporation: *See*—
Damratroski, Harold E.; and Morton, Ray H., 4,169,577, Cl. 251-145.000.
Traina, John L.: *See*—
Schonberger, Abram, 4,169,391, Cl. 74-5.00R.
Trayer, Frank C. Method and apparatus for fusing electrical power equipment enclosed in a tank and surrounded by insulating fluid. 4,170,000, Cl. 337-204.000.
Tregoning, Geoffrey R., to Westinghouse Brake & Signal Co. Ltd. Friction brake apparatus and slack adjusting means therefor. 4,169,525, Cl. 188-196.00D.
Treuner, Uwe D.; and Breuer, Hermann, to E. R. Squibb & Sons, Inc. 7β-[[[2-Acylamino]-1,2-dioxoethyl]aminojacyl cephalosporins. 4,169,947, Cl. 544-27.000.
Tri Tool, Inc.: *See*—
Astle, William H., 4,169,396, Cl. 82-1.00L.
Tronich, Wolfgang: *See*—
Berthold, Rudiger; and Tronich, Wolfgang, 4,169,851, Cl. 260-562.00K.
Trosper, Milton F., Jr.: *See*—
Heitmann, Glenn A.; and Trosper, Milton F., Jr., 4,169,915, Cl. 428-310.000.
TRW Inc.: *See*—
Handy, Roland J.; and Zimmerman, Thomas A., 4,170,041, Cl. 364-784.000.
Hodge, Malcolm H., 4,169,656, Cl. 350-96.150.
Tsang, Won-Tien: *See*—
Logan, Ralph A.; and Tsang, Won-Tien, 4,169,997, Cl. 331-94.50H.
Tsiang, Chong L.; and Bier, Kenneth C., to Colt Industries Operating Corp. Circuit means and apparatus for controlling the air-fuel ratio supplied to a combustion engine. 4,169,439, Cl. 123-119.0EC.
Tsien, Hsue C., to Exxon Research & Engineering Co. Electrically conductive polyolefin compositions. 4,169,816, Cl. 252-511.000.
Tsuchihashi, Akira, to Hitachi, Ltd. Fluid pressure actuator. 4,169,404, Cl. 91-61.000.
Tsuchiya, Takao: *See*—
Yamakoshi, Akira; and Tsuchiya, Takao, 4,170,023, Cl. 358-19.000.
Tsuchiya, Tsutomu: *See*—
Umezawa, Hamao; Umezawa, Sumio; and Tsuchiya, Tsutomu, 4,169,939, Cl. 536-10.000.
Tsunemoto, Shiro; Mizuguchi, Teruki; and Hirayama, Eiichi, to Fuji Plastic Co. Control apparatus. 4,169,405, Cl. 92-13.600.
Tsuruta, Masamichi: *See*—
Tanaka, Yoichi; Tsuruta, Masamichi; Takahashi, Koji; Hasegawa, Tsutomu; and Hori, Makoto, 4,169,803, Cl. 252-62.900.
Tsuruta, Yasuo. Method and device for automatically increasing the restoring force of a pneumatic tire. 4,169,497, Cl. 152-418.000.
Tsutsui, Nobuyuki; Omura, Hitoshi; Mizobe, Takashi; Kanda, Katsumi; and Fujimoto, Terunori, to Toyo Kohan Co., Ltd. Steel sheets and method of treating steel sheets. 4,169,916, Cl. 428-447.000.

Tsuzurahara, Mamoru: *See—*
Oguro, Tomokatsu; Ishida, Yoshio; Tsuzurahara, Mamoru; and Kobayashi, Satoshi, 4,169,987, Cl. 315-39.510.
Tuley, Eugene N.: *See—*
McDonough, Edward C.; and Tuley, Eugene N., 4,169,692, Cl. 415-115.000.
Turk, Leonard G.; Yuhas, Gerald J.; and Cantarutti, Armindo, to NRM Corporation. Post cure inflator. 4,169,698, Cl. 425-28.00P.
Uchiyama, Haruki: *See—*
Yoshioka, Kengo; Nozato, Teruichi; Uchiyama, Haruki; Satoh, Akira; Inoue, Shigeo; Togino, Yuji; Mori, Keisuke; and Satou, Ituro, 4,169,700, Cl. 431-174.000.
Udagawa, Hisao: *See—*
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Umezawa, Hamao; Umezawa, Sumio; and Tsuchiya, Tsutomu, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Processes for the production of 3',4'-dideoxykanamycin B. 4,169,939, Cl. 536-10.000.
Umezawa, Hamao: *See—*
Miyazawa, Takeo; Horiuchi, Yukio; Akita, Eiichi; Umezawa, Hamao; and Umezawa, Sumio, 4,169,890, Cl. 424-180.000.
Umezawa, Sumio: *See—*
Miyazawa, Takeo; Horiuchi, Yukio; Akita, Eiichi; Umezawa, Hamao; and Umezawa, Sumio, 4,169,890, Cl. 424-180.000.
Umezawa, Hamao; Umezawa, Sumio; and Tsuchiya, Tsutomu, 4,169,939, Cl. 536-10.000.
Umphrey, Ronald W.: *See—*
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Union Camp Corporation: *See—*
Burgess, Roland A., 4,169,419, Cl. 111-2.000.
Union Carbide Corporation: *See—*
D'Silva, Themistocles D. J., 4,169,894, Cl. 424-277.000.
Graboski, James J., 4,169,910, Cl. 428-35.000.
Miller, John C.; Burnett, Archibald L.; and Scarola, Leonard S., 4,169,679, Cl. 366-76.000.
Union Special Corporation: *See—*
Hayes, Robert A.; and Frendreis, James A., 4,169,422, Cl. 112-121.120.
Uniroyal, Inc.: *See—*
Hunter, Byron A.; and Barrows, Franklin H., 4,169,954, Cl. 560-158.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
Barber, Brian C., 4,169,351, Cl. 60-203.000.
United States Bronze Powders, Inc.: *See—*
Matthews, Paul E.; and Ramsey, Kenneth C., 4,169,730, Cl. 75-157.000.
United States Gypsum Company: *See—*
De Rooy, Felix J.; Daniel, Thell D.; Annes, Erle C.; and Arnold, Billy G., 4,169,747, Cl. 156-39.000.
U.S. Industries Inc.: *See—*
Ellens, Gordon A., 4,169,614, Cl. 280-801.000.
United States of America
Air Force: *See—*
Benkley, Fred G.; and Sauermann, Gerhard O., 4,170,025, Cl. 358-139.000.
Birkemeier, William P.; and Sill, Anthony E., 4,170,011, Cl. 343-100.0CS.
Goebel, Robert H.; and Fogle, Dale A., 4,170,008, Cl. 343-7.0PF.
Goldie, Harry, 4,170,007, Cl. 343-5.00R.
Hamer, Edward G., 4,170,009, Cl. 343-18.00E.
Taylor, Richard L.; Drosd, Ralph D., deceased; and Gregory, Luther W., administrator, 4,169,993, Cl. 325-470.000.
Wise, Carl D.; and Wiegand, Richard J., 4,169,995, Cl. 328-63.000.
Energy: *See—*
Bamberger, Carlos E.; and Richardson, Donald M., deceased, 4,169,884, Cl. 423-648.00R.
Interior: *See—*
Kimmel, Donald S., 4,170,037, Cl. 363-57.000.
Navy: *See—*
Black, Lawrence M., 4,170,013, Cl. 343-700.0MS.
Clark, Frank B., 4,169,749, Cl. 156-156.000.
Drew, Gene R.; Gylseth, Herman M.; Van Buskirk, William O.; and Newkirk, Richard V., 4,169,568, Cl. 244-148.000.
Kaloi, Cyril M., 4,170,012, Cl. 343-700.0MS.
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U.S. Philips Corporation: *See—*
Besselere, Jean-Pierre, 4,169,755, Cl. 156-616.00A.
Blom, Nico, 4,169,684, Cl. 400-124.000.
Stelwagen, Jan; and van Sambeeck, Alexius J. T., 4,169,986, Cl. 313-383.000.
United States Trading International, Inc.: *See—*
De Long, Charles F., 4,169,902, Cl. 427-4.000.
United Technologies Corporation: *See—*
Crowe, Gearld E., 4,169,555, Cl. 239-265.330.
Falk, Thomas, 4,170,006, Cl. 343-5.0CM.
Universal Instruments Corporation: *See—*
Ragard, Phillip A.; and Holmes, Robert H., 4,169,541, Cl. 221-281.000.
University Patents, Inc.: *See—*
Scallen, Terence J.; and Morrow, Cary J., 4,169,944, Cl. 536-27.000.
UOP Inc.: *See—*
Hayes, John C., 4,169,813, Cl. 252-441.000.
Hilfman, Lee, 4,169,783, Cl. 208-111.000.
Thompson, H. Lytle, 4,169,782, Cl. 208-102.000.
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B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977	B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976	B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976	B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
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B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976	B 382,120	4,013,639	Mar. 23, 1976	Mar. 22, 1977
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977	B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977	B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976	B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976	B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976	B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976	B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 236,266	4,013,624	Mar. 23, 1976	Mar. 22, 1977	B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977	B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976	B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976	B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976	B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976	B 388,675	4,012,459	Mar. 30, 1976	Mar. 15, 1977
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977	B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976	B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977	B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976	B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 281,162	4,009,481	Mar. 23, 1976	Feb. 22, 1977	B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976	B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977	B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976	B 391,828	4,014,933	Apr. 6, 1976	Mar. 29, 1977
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976	B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976	B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976	B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976	B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976	B 394,742	4,009,285	Apr. 13, 1976	Feb. 22, 1977
B 311,779	4,013,481	Feb. 10, 1976	Mar. 22, 1977	B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977	B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976	B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 328,065	4,014,752	Mar. 30, 1976	Mar. 29, 1977	B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 328,077	4,014,860	Apr. 13, 1976	Mar. 29, 1977	B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977	B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977	B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976	B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977	B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976	B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977	B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977	B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 335,783	4,013,744	Mar. 30, 1976	Mar. 22, 1977	B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976	B 401,221	4,014,791	Apr. 6, 1976	Mar. 29, 1977
B 337,023	4,013,188	Mar. 30, 1976	Mar. 22, 1977	B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977	B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976	B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977	B 402,657	4,013,665	Apr. 6, 1976	Mar. 22, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976	B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 344,669	4,013,655	Mar. 16, 1976	Mar. 22, 1977	B 403,076	4,014,917	Apr. 20, 1976	Mar. 29, 1977
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976	B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976	B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976	B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977	B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 354,222	4,012,305	Mar. 23, 1976	Mar. 15, 1977	B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976	B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976	B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 356,470	4,014,789	Mar. 23, 1976	Mar. 29, 1977	B 405,899	4,097,710	Mar. 23, 1976	Mar. 21, 1978
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977	B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976	B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976	B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 359,768	4,013,684	Mar. 30, 1976	Mar. 22, 1977	B 407,812	4,010,006	Mar. 23, 1976	Mar. 1, 1977
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976	B 408,123	4,014,887	Apr. 13, 1976	Mar. 29, 1977
B 361,954	4,014,753	Apr. 6, 1976	Mar. 29, 1977	B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977	B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976	B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 367,092	4,014,920	Apr. 13, 1976	Mar. 29, 1977	B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976	B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976	B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976	B 412,023	4,130,788	Apr. 6, 1978	Dec. 19, 1978
B 369,373	4,013,683	Mar. 23, 1976	Mar. 22, 1977	B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 369,379	4,013,754	Mar. 30, 1976	Mar. 22, 1977	B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976	B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977	B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 371,635	4,010,290	Mar. 23, 1976	Mar. 1, 1977	B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE	DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976	B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976	B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976	B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976	B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 415,590	4,009,317	Mar. 23, 1976	Feb. 22, 1977	B 440,632	4,014,955	Apr. 13, 1976	Mar. 29, 1977
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977	B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976	B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976	B 441,543	4,014,755	Mar. 23, 1976	Mar. 29, 1977
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977	B 441,605	4,026,862	Feb. 3, 1976	May 31, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976	B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 417,498	4,013,471	Mar. 23, 1976	Mar. 22, 1977	B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976	B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976	B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976	B 442,431	4,011,260	Mar. 23, 1976	Mar. 8, 1977
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977	B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976	B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976	B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977	B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 421,608	4,013,806	Mar. 23, 1976	Mar. 22, 1977	B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976	B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976	B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 422,156	4,010,401	Mar. 23, 1976	Mar. 1, 1977	B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976	B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976	B 444,078	4,014,854	Mar. 23, 1976	Mar. 29, 1977
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976	B 444,294	4,013,634	Mar. 30, 1976	Mar. 22, 1977
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976	B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976	B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976	B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 424,410	4,021,196	Mar. 30, 1976	May 3, 1977	B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976	B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977	B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 425,285	4,014,676	Apr. 13, 1976	Mar. 29, 1977	B 446,956	4,014,765	Apr. 13, 1976	Mar. 29, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976	B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976	B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 426,157	4 013,714	Mar. 23, 1976	Mar. 22, 1977	B 449,837	4,128,582	Mar. 2, 1976	Dec. 5, 1978
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976	B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976	B 449,988	4,014,794	Mar. 30, 1976	Mar. 29, 1977
B 426,274	4,014,949	Jan. 20, 1976	Mar. 29, 1977	B 449,989	4,061,572	Mar. 30, 1976	Dec. 6, 1977
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976	B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976	B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976	B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976	B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977	B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976	B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976	B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976	B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976	B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976	B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977	B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976	B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976	B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976	B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976	B 452,293	4,014,726	Mar. 30, 1976	Mar. 29, 1977
B 430,213	4,013,514	Mar. 30, 1976	Mar. 22, 1977	B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976	B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976	B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977	B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976	B 452,915	4,013,933	Mar. 30, 1976	Mar. 22, 1977
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976	B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976	B 452,944	4,009,773	Mar. 30, 1976	Mar. 1, 1977
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976	B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976	B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977	B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976	B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976	B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 432,265	4,013,480	Mar. 23, 1976	Mar. 22, 1977	B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977	B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976	B 453,960	4,014,701	Apr. 13, 1976	Mar. 29, 1977
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976	B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976	B 454,833	4,008,733	Mar. 30, 1976	Feb. 22, 1977
B 433,707	4,013,594	Mar. 23, 1976	Mar. 22, 1977	B 455,423	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 433,892	4,016,061	Apr. 6, 1976	Apr. 5, 1977	B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 433,930	4,012,324	Mar. 23, 1976	Mar. 15, 1977	B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976	B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976	B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977	B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977	B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977	B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976	B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977	B 456,384	4,014,859	Apr. 6, 1976	Mar. 29, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976	B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976	B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977	B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 437,986	4,011,399	Apr. 20, 1976	Mar. 8, 1977	B 456,905	4,013,431	Mar. 23, 1976	Mar. 22, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977	B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976	B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976	B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,819	4,169,817	Apr. 13, 1976	Oct. 2, 1979
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,190	4,010,786	Mar. 30, 1976	Mar. 8, 1977
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,408	4,018,890	Mar. 23, 1976	Apr. 19, 1977
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,257	4,078,715	Jan. 13, 1976	Mar. 14, 1978
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,685	4,013,661	Mar. 30, 1976	Mar. 22, 1977
B 461,752	4,016,541	Apr. 20, 1976	Apr. 5, 1977
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,030	4,009,342	Mar. 23, 1976	Feb. 22, 1977
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,591	4,015,051	Mar. 30, 1976	Mar. 29, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,491	4,015,612	Mar. 30, 1976	Apr. 5, 1977
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,419	4,011,087	Mar. 23, 1976	Mar. 8, 1977
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,421	4,014,739	Mar. 30, 1976	Mar. 29, 1977
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,228	4,052,954	Feb. 17, 1976	Oct. 11, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,305	4,014,043	Apr. 6, 1976	Mar. 22, 1977
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 470,945	4,014,848	Apr. 13, 1976	Mar. 29, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,681	4,012,844	Apr. 13, 1976	Mar. 22, 1977
B 471,706	4,076,275	Mar. 16, 1976	Feb. 28, 1978
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,591	4,013,029	Apr. 6, 1976	Mar. 22, 1977
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 475,801	4,056,759	Mar. 30, 1976	Nov. 1, 1977
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,542	4,013,549	Mar. 30, 1976	Mar. 22, 1977
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 477,892	4,010,355	Mar. 30, 1976	Mar. 1, 1977
B 478,234	4,010,421	Mar. 30, 1976	Mar. 1, 1977
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 478,759	4,055,681	Mar. 16, 1976	Oct. 25, 1977
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,251	4,008,700	Mar. 23, 1976	Feb. 22, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,190	4,013,468	Mar. 30, 1976	Mar. 22, 1977
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,746	4,014,923	Mar. 23, 1976	Mar. 29, 1977
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,437	4,013,740	Mar. 30, 1976	Mar. 22, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 485,972	4,017,472	Mar. 23, 1976	Apr. 12, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,078	4,012,895	Mar. 30, 1976	Mar. 22, 1977
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 487,467	4,014,847	Apr. 13, 1976	Mar. 29, 1977
B 487,529	4,022,750	Mar. 30, 1976	May 10, 1977
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 488,836	4,013,121	Mar. 30, 1976	Mar. 22, 1977
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,711	4,053,467	Mar. 23, 1976	Oct. 11, 1977
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,373	4,010,908	Mar. 30, 1976	Mar. 8, 1977
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,463	4,013,510	Mar. 23, 1976	Mar. 22, 1977
B 493,474	4,013,565	Mar. 23, 1976	Mar. 22, 1977
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,138	4,034,002	Mar. 23, 1976	July 5, 1977
B 494,167	4,129,977	Mar. 23, 1976	Dec. 19, 1978
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,439	4,057,521	Apr. 13, 1976	Nov. 8, 1977
B 494,440	4,056,502	Feb. 17, 1976	Nov. 1, 1977
B 494,450	4,079,029	Feb. 17, 1976	Mar. 14, 1978
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,124	4,060,968	Mar. 9, 1976	Dec. 6, 1977
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,781	4,013,699	Mar. 23, 1976	Mar. 22, 1977
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,293	4,011,412	Mar. 30, 1976	Mar. 8, 1977
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,490	4,118,377	Mar. 23, 1976	Oct. 3, 1978
B 497,571	4,009,997	Mar. 23, 1976	Mar. 1, 1977
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,288	4,013,657	Mar. 23, 1976	Mar. 22, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,370	4,013,544	Mar. 30, 1976	Mar. 22, 1977
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,959	4,014,853	Apr. 13, 1976	Mar. 29, 1977
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,128	4,072,723	Feb. 24, 1976	Feb. 7, 1978
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,379	4,013,696	Mar. 30, 1976	Mar. 22, 1977
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,482	4,012,650	Jan. 13, 1976	Mar. 15, 1977
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,773	4,125,406	Jan. 13, 1976	Nov. 14, 1978
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,371	4,009,401	Mar. 30, 1976	Feb. 22, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,776	4,016,000	Mar. 23, 1976	Apr. 5, 1977
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,221	4,013,627	Mar. 30, 1976	Mar. 22, 1977
B 505,582	4,601,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,760	4,012,835	Apr. 13, 1976	Mar. 22, 1977
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,166	4,014,738	Apr. 13, 1976	Mar. 29, 1977
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,456	4,080,349	Mar. 9, 1976	Mar. 21, 1978
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,640	4,130,505	Feb. 17, 1976	Dec. 19, 1978
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 509,819	4,014,712	Apr. 13, 1976	Mar. 29, 1977
B 510,026	4,016,763	Apr. 13, 1976	Apr. 12, 1977
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,278	4,008,972	Mar. 30, 1976	Feb. 22, 1977
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,836	4,013,795	Mar. 23, 1976	Mar. 22, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,779	4,014,897	Apr. 13, 1976	Mar. 29, 1977
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,346	4,124,330	Mar. 9, 1976	Nov. 7, 1978
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 513,791	4,008,608	Mar. 30, 1976	Feb. 22, 1977
B 514,259	4,013,649	Mar. 23, 1976	Mar. 22, 1977
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 514,839	4,033,816	Mar. 2, 1976	July 5, 1977
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,216	4,076,261	Feb. 17, 1976	Feb. 28, 1978
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,368	4,014,733	Apr. 6, 1976	Mar. 29, 1977
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,625	4,013,542	Mar. 30, 1976	Mar. 22, 1977
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,668	4,013,423	Apr. 6, 1976	Mar. 22, 1977
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,076	4,014,914	Mar. 30, 1976	Mar. 29, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,355	4,014,829	Apr. 13, 1976	Mar. 29, 1977
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,623	4,012,049	Apr. 6, 1976	Mar. 15, 1977
B 519,680	4,014,660	Mar. 30, 1976	Mar. 29, 1977
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,878	4,014,849	Apr. 6, 1976	Mar. 29, 1977
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 520,995	4,009,996	Mar. 23, 1976	Mar. 1, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,985	4,012,404	Mar. 23, 1976	Mar. 15, 1977
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 524,849	4,014,938	Mar. 23, 1976	Mar. 29, 1977
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,279	4,013,138	Apr. 13, 1976	Mar. 22, 1977
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,654	4,011,534	Mar. 23, 1976	Mar. 8, 1977
B 526,942	4,013,700	Mar. 30, 1976	Mar. 22, 1977
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,040	4,013,515	Mar. 23, 1976	Mar. 22, 1977
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,214	4,013,004	Apr. 20, 1976	Mar. 22, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,925	4,014,003	Mar. 30, 1976	Mar. 22, 1977
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,263	4,009,736	Mar. 30, 1976	Mar. 1, 1977
B 530,285	4,013,903	Apr. 6, 1976	Mar. 22, 1977
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,437	4,014,857	Apr. 13, 1976	Mar. 29, 1977
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,709	4,012,944	Apr. 6, 1976	Mar. 22, 1977
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,477	4,014,895	Apr. 13, 1976	Mar. 29, 1977
B 532,679	4,010,706	Apr. 6, 1976	Mar. 8, 1977
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,680	4,014,904	Apr. 20, 1976	Mar. 29, 1977
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,915	4,012,668	Mar. 23, 1976	Mar. 15, 1977
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 537,990	4,057,651	Jan. 13, 1976	Nov. 8, 1977
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,703	4,013,206	Apr. 13, 1976	Mar. 22, 1977
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 542,258	4,013,536	Mar. 23, 1976	Mar. 22, 1977
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,344	4,012,746	Mar. 30, 1976	Mar. 15, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,677	4,015,654	Apr. 6, 1976	Apr. 5, 1977
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,655	4,015,048	Feb. 24, 1976	Mar. 29, 1977
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,274	4,016,375	Mar. 23, 1976	Apr. 5, 1977
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,721	4,013,435	Mar. 23, 1976	Mar. 22, 1977
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,394	4,016,094	Apr. 20, 1976	Apr. 5, 1977
B 559,441	4,013,609	Mar. 23, 1976	Mar. 22, 1977
B 559,631	4,011,406	Mar. 23, 1976	Mar. 8, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,165	4,013,002	Mar. 30, 1976	Mar. 22, 1977
B 561,166	4,011,809	Mar. 30, 1976	Mar. 15, 1977
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,519	4,013,125	Mar. 30, 1976	Mar. 22, 1977
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,255	4,015,996	Mar. 30, 1976	Apr. 5, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 565,754	4,011,626	Mar. 30, 1976	Mar. 15, 1977
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,076	4,011,187	Mar. 23, 1976	Mar. 8, 1977
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 570,925	4,040,802	Mar. 23, 1976	Aug. 9, 1977
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 572,726	4,015,020	Feb. 24, 1976	Mar. 29, 1977
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,114	4,014,843	Apr. 6, 1976	Mar. 29, 1977
B 573,991	4,013,704	Mar. 30, 1976	Mar. 22, 1977
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,761	4,013,123	Apr. 13, 1976	Mar. 22, 1977
B 575,776	4,013,124	Apr. 20, 1976	Mar. 22, 1977
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,385	4,009,498	Mar. 30, 1976	Mar. 1, 1977
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 1976
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,153	4,013,745	Mar. 30, 1976	Mar. 22, 1977
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 581,564	4,036,653	Mar. 23, 1976	July 19, 1977
B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 591,141	4,013,631	Mar. 23, 1976	Mar. 22, 1977
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 593,781	4,015,953	Mar. 16, 1976	Apr. 5, 1977
B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 632,416	4,076,698	Mar. 9, 1976	Feb. 28, 1978
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 2ND DAY OF OCTOBER, 1979

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Caterpillar Tractor Co.: *See*—
Hansen, Robert C., T987,002, Cl. 210-121.000.

Feuer, Michael; and Nan, Ning, to International Business Machines Corporation. System for determining the extent of overlap between two polygons. T987,004, 10-2-79, Cl. 364-300.000.

Hansen, Robert C., to Caterpillar Tractor Co. Reservoir with controlled pathway to a pump suction line. T987,002, 10-2-79, Cl. 210-121.000.

International Business Machines Corporation: *See*—
Feuer, Michael; and Nan, Ning, T987,004, Cl. 364-300.000.

Johnson, Norbert L.; and Knowd, Michael J., to Minnesota Mining and Manufacturing Company. Retroluminometer. T987,003, 10-2-79, Cl. 356-445.000.

Knowd, Michael J.: *See*—
Johnson, Norbert L.; and Knowd, Michael J., T987,003, Cl. 356-445.000.

Minnesota Mining and Manufacturing Company: *See*—
Johnson, Norbert L.; and Knowd, Michael J., T987,003, Cl. 356-445.000.

Nan, Ning: *See*—
Feuer, Michael; and Nan, Ning, T987,004, Cl. 364-300.000.

O'Brien, Louis G., to Pennsylvania Department of Transportation, The. Belt loader having sweeping assembly. T987,001, 10-2-79, Cl. 15-82.000.

Pennsylvania Department of Transportation, The: *See*—
O'Brien, Louis G., T987,001, Cl. 15-82.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 2ND DAY OF OCTOBER, 1979

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AGFA-GEVAERT N.V.: *See*—
Laridon, Urbain L.; Poot, Albert L.; and Willems, Jozef F., Re. 30,107, Cl. 427-145.000.

Allied Chemical Corporation: *See*—
Polk, Donald E.; and Morris, Robert C., Re. 30,106, Cl. 204-23.000.

Burnham, Peter B., to Harsco Corporation. Dock leveling apparatus. Re. 30,104, Cl. 14-71.300.

Harsco Corporation: *See*—
Burnham, Peter B., Re. 30,104, Cl. 14-71.300.

Laridon, Urbain L.; Poot, Albert L.; and Willems, Jozef F., to AGFA-GEVAERT N.V. Thermographic recording process. Re. 30,107, Cl. 427-145.000.

Morris, Robert C.: *See*—
Polk, Donald E.; and Morris, Robert C., Re. 30,106, Cl. 204-23.000.

Polk, Donald E.; and Morris, Robert C., to Allied Chemical Corporation. Method of producing amorphous cutting blades. Re. 30,106, Cl. 204-23.000.

Poot, Albert L.: *See*—
Laridon, Urbain L.; Poot, Albert L.; and Willems, Jozef F., Re. 30,107, Cl. 427-145.000.

Rodder, Jerome A. Fluid measuring apparatus. Re. 30,105, Cl. 73-27.00R.

Willems, Jozef F.: *See*—
Laridon, Urbain L.; Poot, Albert L.; and Willems, Jozef F., Re. 30,107, Cl. 427-145.000.

LIST OF PLANT PATENTEES

Jackson & Perkins Company: *See*—
Oly, Hendrik W., 4,462, Cl. 28.000.

Oly, Hendrik W., to Jackson & Perkins Company. Rose plant—Jaguar. 4,462, 10-2-79, Cl. 28.000.

LIST OF DESIGN PATENTEES

Action Leathercraft, Inc.: *See*—
Hillinger, George, 253,019, Cl. D2-400.000.

Anderson, Walter C., to General Electric Company. Electric piston hair dryer or similar article. 253,073, 10-2-79, Cl. D28-13.000.

Antos, Joseph. Slide viewer. 253,058, 10-2-79, Cl. D16-14.000.

Atari, Inc.: *See*—
Kearney, Phillip C., 253,061, Cl. D21-01.000.

Barouh, Victor. Bottle or similar article. 253,037, 10-2-79, Cl. D9-128.000.

Barrett, Monroe C.: *See*—
Fachini, Robert M.; Barrett, Monroe C.; and Scallions, Jimmie L., 253,057, Cl. D15-26.000.

Bennett, Richard C. Putter head. 253,065, 10-2-79, Cl. D21-217.000.

Blanc, Georges. Cigar box. 253,072, 10-2-79, Cl. D27-43.000.

Breger, Carl-Arne, to Sandvik Aktiebolag. Cover for handle of a screw driver. 253,030, 10-2-79, Cl. D8-83.000.

Bridgeport Metal Goods Manufacturing Company, The: *See*—
White, John C., 253,032, Cl. D9-57.000.
White, John C., 253,039, Cl. D9-168.000.

Caranica, Gloria: *See*—
Kimbrough, Richard W. M.; and Caranica, Gloria, 253,064, Cl. D21-184.000.

Clairol Incorporated: *See*—
Wistrand, John, 253,074, Cl. D28-16.000.

Clanton, W. Porter, to Quaker Oats Company, The. Toy blood pressure tester. 253,063, 10-2-79, Cl. D21-109.000.

Czasonis, John L., to Oneida Ltd. Spoon or similar article. 253,026, 10-2-79, Cl. D7-137.000.

Denhoff, Myron L., to Myden Industries, Inc. Display rack. 253,023, 10-2-79, Cl. D6-186.000.
Dinand, Pierre: *See—*
Meyer, Richard E.; and Dinand, Pierre, 253,033, Cl. D9-60.000.
Meyer, Richard E.; and Dinand, Pierre, 253,034, Cl. D9-60.000.
Meyer, Richard E.; and Dinand, Pierre, 253,035, Cl. D9-63.000.
Meyer, Richard E.; and Dinand, Pierre, 253,036, Cl. D9-63.000.
Ellard, Stanley. Digital clock. 253,041, 10-2-79, Cl. D10-15.000.
Escher, Esther. Pyramid finger ring. 253,049, 10-2-79, Cl. D11-34.000.
Fachini, Robert M.; Barrett, Monroe C.; and Scallions, Jimmie L., to International Harvester Company. Cotton picker. 253,057, 10-2-79, Cl. D15-26.000.
Fee, Graham M. Clock. 253,042, 10-2-79, Cl. D10-15.000.
Fournier, Erick-Pierre; and Hill, Ethel V. Toiletry blister package. 253,040, 10-2-79, Cl. D9-192.000.
Frank, Michael B., to Uniforms to You & Co. Jumper. 253,016, 10-2-79, Cl. D2-146.000.
Fudro, Stanley J. Egg decorating device. 253,055, 10-2-79, Cl. D19-35.000.
Gelius, Siegfried, to Optische Werke G. Rodenstock. Optical lens vertex measuring projector. 253,043, 10-2-79, Cl. D10-46.000.
General Electric Company: *See—*
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Gidseg, Edward. Combined clip-on handle and panel insert for cabinet doors, drawers or the like. 253,031, 10-2-79, Cl. D8-301.000.
Gilleran, John B. Patient's head protector for operating tables. 253,070, 10-2-79, Cl. D24-7.000.
Gunn, Daniel. Pull tab can opener. 253,028, 10-2-79, Cl. D8-40.000.
Hartley, Ronald C. Fireplace heat exchanger. 253,067, 10-2-79, Cl. D23-95.000.
Hewson, Bruce C. Thermostat regulator. 253,044, 10-2-79, Cl. D10-50.000.
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Fournier, Erick-Pierre; and Hill, Ethel V., 253,040, Cl. D9-192.000.
Hillinger, George, to Action Leathercraft, Inc. Tool holder. 253,019, 10-2-79, Cl. D2-400.000.
Horton, George L.: *See—*
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Fachini, Robert M.; Barrett, Monroe C.; and Scallions, Jimmie L., 253,057, Cl. D15-26.000.
Itoh, Kunio, to Pentel Kabushiki Kaisha. Ball point pen or similar article. 253,060, 10-2-79, Cl. D19-48.000.
Jovan, Inc.: *See—*
Meyer, Richard E.; and Dinand, Pierre, 253,033, Cl. D9-60.000.
Meyer, Richard E.; and Dinand, Pierre, 253,034, Cl. D9-60.000.
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Karamian, Narbik A. Faucet for protecting sterile fluid systems. 253,066, 10-2-79, Cl. D23-3.000.
Kearney, Phillip C., to Atari, Inc. Submarine amusement game cabinet. 253,061, 10-2-79, Cl. D21-01.000.
Keller, Huey T., to Vaughan Furniture Company, Inc. Mirror. 253,024, 10-2-79, Cl. D6-234.000.
Kimbrough, Richard W. M.; and Caranica, Gloria, to Quaker Oats Company, The. Toy doll. 253,064, 10-2-79, Cl. D21-184.000.
Kupka, Rudolph J. Scooter. 253,062, 10-2-79, Cl. D21-81.000.
Lewis, Reuben. Food mold. 253,025, 10-2-79, Cl. D7-44.000.
Lohmeyer, Kurt W., to Tru-Spoke Inc. Vehicle wheel. 253,050, 10-2-79, Cl. D12-205.000.
Marchesi, Giovanni. Sports shoe. 253,017, 10-2-79, Cl. D2-309.000.
Meyer, Richard E.; and Dinand, Pierre, to Jovan, Inc. Bottle. 253,033, 10-2-79, Cl. D9-60.000.
Meyer, Richard E.; and Dinand, Pierre, to Jovan, Inc. Bottle. 253,034, 10-2-79, Cl. D9-60.000.
Meyer, Richard E.; and Dinand, Pierre, to Jovan, Inc. Combined bottle and cap. 253,035, 10-2-79, Cl. D9-63.000.
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Montez, Donald. Dental ceramic stain tray. 253,071, 10-2-79, Cl. D24-10.000.
Morgan, Thomas E. Spider gauge for heavy duty vehicle brakes. 253,046, 10-2-79, Cl. D10-64.000.
Morgan, Thomas E. I.D. brake drum gauge for heavy duty vehicle brakes. 253,047, 10-2-79, Cl. D10-64.000.
Morgan, Thomas E. Heavy duty vehicle brake shoe gauge. 253,048, 10-2-79, Cl. D10-64.000.
Myden Industries, Inc.: *See—*
Denhoff, Myron L., 253,023, Cl. D6-186.000.
Nash, Stanley P., to Schweiger Industries, Inc. Seat or similar article. 253,021, 10-2-79, Cl. D6-62.000.
Ogilvie, Kenneth A., to Walker Corsweller & Company Limited. Hand held showerhead. 253,069, 10-2-79, Cl. D23-35.000.
Oneida Ltd.: *See—*
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Optische Werke G. Rodenstock: *See—*
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Raintree Buckle & Jewelry, Inc.: *See—*
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Renny, Arthur B. Aquarium. 253,075, 10-2-79, Cl. D30-6.000.
Rizer, Brooks, to Textile & Industrial Sales, Inc. Combined pocket ruler and magnifier. 253,045, 10-2-79, Cl. D10-62.000.
Robley, Spencer H. Tennis ball carrier. 253,018, 10-2-79, Cl. D2-400.000.
Ross, Richard F. Stove. 253,068, 10-2-79, Cl. D23-97.000.
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Sligh, Allen E. Combined rack and dispenser for spooled wire. 253,022, 10-2-79, Cl. D6-85.000.
Speaker, Edwin A. Microscope stand. 253,059, 10-2-79, Cl. D16-57.000.
Stevens, Thomas H.; and Horton, George L., to General Signal Corporation. Vacuum cleaner nozzle. 253,054, 10-2-79, Cl. D15-64.000.
Stone, Larry J.; and Wiles, Chester L. Deep placement fertilizer applicator. 253,056, 10-2-79, Cl. D15-13.000.
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Whitaker, David N. Fireplace grate. 253,027, 10-2-79, Cl. D7-207.000.
White, John C., to Bridgeport Metal Goods Manufacturing Company, The. Cosmetic container. 253,032, 10-2-79, Cl. D9-57.000.
White, John C., to Bridgeport Metal Goods Manufacturing Company, The. Cosmetic container. 253,039, 10-2-79, Cl. D9-168.000.
Wikoff, Mark W. Carcass splitting band saw. 253,029, 10-2-79, Cl. D8-66.000.
Wiles, Chester L.: *See—*
Stone, Larry J.; and Wiles, Chester L., 253,056, Cl. D15-13.000.
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CLASSIFICATION OF PATENTS

ISSUED OCTOBER 2, 1979

NOTE.—First number, class; second number, subclass; third number, patent number

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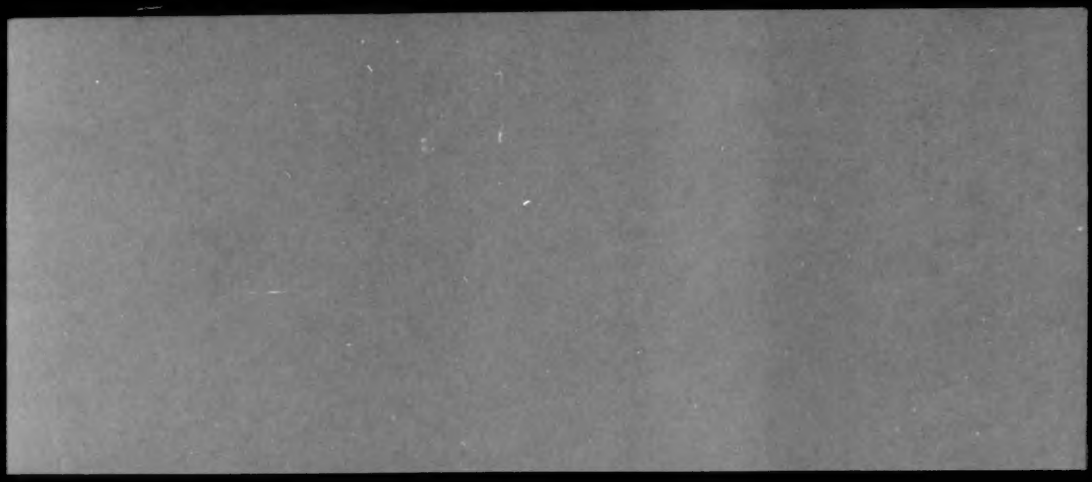

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